

Technical Elements of Exceptional Event and Natural Events Action Plan Demonstrations

Presented by
Wyoming Department of Environmental Quality, Air Quality Division

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Background

On March 22, 2007, the Environmental Protection Agency (EPA) promulgated the “Treatment of Data Influenced by Exceptional Events; Final Rule,” otherwise known as the Exceptional Event Rule (EER). This rule created a process for the exclusion of air quality data related to exceedances of the National Ambient Air Quality Standards (NAAQS) from regulatory decisions by the EPA.

An Exceptional Event is defined in 40 CFR Part 50.1 (j):

Exceptional event means an event that affects air quality, is not reasonably controllable or preventable, is an event caused by human activity that is unlikely to recur at a particular location or a natural event, and is determined by the Administrator in accordance with 40 CFR 50.14 to be an exceptional event. It does not include stagnation of air masses or meteorological inversions, a meteorological event involving high temperatures or lack of precipitation, or air pollution relating to source noncompliance.

Per the EER found in 40 CFR Part 50.14 (iv), a demonstration to justify data exclusion shall provide evidence that:

- (A) The event satisfies the criteria set forth in 40 CFR 50.1(j);*
- (B) There is a clear causal relationship between the measurement under consideration and the event that is claimed to have affected air quality in the area;*
- (C) The event is associated with a measured concentration in excess of normal historical fluctuations, including background; and*
- (D) There would have been no exceedance or violation but for the event.*

In order for data to be excluded under the EER, states and other air agencies should submit documentation to the EPA showing that the exceedance of the NAAQS in question would not have occurred in the absence of a natural or exceptional event. As stated above, a demonstration must satisfactorily address each provision in 40 CFR Part 50.14 (iv) in order for data exclusion to be considered. The EPA uses a “weight-of-evidence” approach to evaluate these elements. Therefore, complete demonstrations must contain sufficient narrative and evidential support for each of these provisions.

Because the EPA only accepts Exceptional Event (EE) demonstrations submitted by the state or other local air agency, industrial entities which operate ambient air monitoring networks that wish to request data to be excluded under the EER must submit demonstrations to the state. The state will then conduct an internal review of the demonstration before making a decision to either deny or approve the request to flag the data. Additional information on the EER including EPA Guidance can be found by visiting the EPA’s website <http://www.epa.gov/ttn/analysis/exevents.htm>. Additional information on the Wyoming Department of Environmental Quality Air Quality Divisions’ (AQD) internal review process and examples of demonstrations can be found by visiting the AQD’s website at <http://deq.wyoming.gov/aqd/monitoring/> and looking under the Resources tab.

Introduction

In March 2007, EPA Region 8 approved the Natural Events Action Plan (NEAP) as an option under the 1996 Natural Events Policy. The NEAP approval occurred around the same time that the EPA promulgated the EER. The AQD enacted the Natural Events Action Plan (NEAP) as a way for coal mines in the Powder River Basin to control dust from high wind events and minimize Particulate Matter emissions. In 2012 the AQD conducted a five-year review of the NEAP. As a result of this review it was determined that while certain elements of the NEAP should be preserved, such as continuing the practice of issuing high wind/blowing dust notifications for the Powder River Basin in cooperation with the National Weather Service, ultimately the NEAP had become outdated and some sections created inconsistencies with current practices. Based on this, and significant overlap with the EER, the AQD discontinued the use of the NEAP on September 16, 2014.

In response to comments received during the NEAP review, the AQD committed to developing a compilation of technical elements that have been submitted as part of EE/NEAP demonstrations as a resource for the creation of future submittals. This document fulfills this commitment.

This document breaks technical elements into broad categories and then provides good examples of specific elements within these categories. Each element is drawn directly from a NEAP or EE demonstration submitted between 2006 and 2014, and represents every facility in Wyoming that has presented a demonstration to date, including the AQD.

Other comments received during the NEAP review requested that the AQD develop specific guidance to accompany the EER. Because it is a Federal Rule, the AQD has no legal authority to develop guidance on the EER. Only the EPA, as the propagator of the rule, can issue guidance on the EER. This working guidance may be found in the “Interim Guidance on the Preparation of Demonstrations in Support of Requests to Exclude Ambient Air Quality Data Affected by High Winds Under the Exceptional Event Rule” (EPA Guidance).

This document, therefore, does not constitute guidance on the EER, nor is the list of elements presented here intended to be exhaustive, or the use of all elements in every demonstration mandatory. Because each facility and exceedance is unique, the inclusion of certain elements may not serve to contribute to the weight of evidence-based approach to a demonstration discussed in the EPA Guidance. For example, conceptual graphics may be useful in explaining what happens during a Stratospheric Intrusion, but may not be necessary in a High Wind demonstration. Therefore, this document should be viewed as an informative tool to help facilities put together effective EE demonstrations on an event-specific basis.


It is important to note that the inclusion or exclusion of any of the following elements will not and can not guarantee the acceptance or rejection of an EE flag. Indeed, some of the following elements, while independently excellent, were drawn from denied flagging requests. The elements presented in this document have been taken out of context and should be viewed as such. In all cases, the final responsibility to reasonably demonstrate that an exceedance of the NAAQS was a result of an EE lies with the facility where the exceedance occurred.

Summaries

Written summaries give narrative context to an event. These are typically where a facility synthesizes its main argument for flagging the data in question under the Exceptional Event Rule, drawing on and interpreting the quantitative and qualitative data provided by other technical elements. Summaries serve to tie documents together and may include presentation of facts, discussion and analyses of data, and legal background and basis for the facility and event. It is important to note that demonstrations will ultimately be reviewed by individuals, including members of the public and the EPA, who may be unfamiliar with the facility. Because of this, demonstrations should explain, label, or identify any background information necessary to familiarize readers with the facility and monitoring network.

Cover Letter

Most demonstrations are submitted with a cover letter that provides valuable information such as facility contact information, a date stamp for tracking purposes, and a brief summary of the event and the contents of the demonstration.




December 3, 2007

GREEN RIVER SODA ASH OPERATIONS
P.O. BOX 551
GREEN RIVER, WYOMING 82935-0551
(307)-875-3350

Ms. Amber Potts
Monitoring Project Advisor-WDEQ/AQD
Herschler Building
122 W. 25th Street
Cheyenne, Wyoming 82002

RE: Ambient Air Monitoring Exceedence (PM₁₀)
General Chemical (Soda Ash) Partners
Operating Permit 30-123-1



Dear Ms. Potts:

General Chemical exceeded the Ambient Air Quality Standard for PM₁₀ at Site 4B on April 18, 2007. As a result, the WDEQ/AQD has requested additional information to substantiate the exceedence as a Natural Event. The following information has been request by the Division:

1. Map of the facility and monitoring locations. **(Attached).**
2. Wind Rose for the day of the excursion. **(Attached).**
3. PM₁₀ concentrations for the day of the excursion.

PM ₁₀ Site 1A	63.4 ug/Act. M ³	(East of plant)
PM ₁₀ Site 1B	61.1 ug/Act. M ³	(East of plant)
PM ₁₀ Site 3B	13.5 ug/Act. M ³	(SW of plant)
PM ₁₀ Site 4B	168.0 ug/Act. M ³	(North of plant)
4. Summary of daily wind speeds for each day of the month, showing abnormally high winds on the day of the excursion. **(See attached table).**
5. Actions General Chemical took to help control the PM₁₀ during this high wind event. **During this event, Searle Brothers Construction was operating a water truck on the D-Cell dike expansion. General Chemical was not operating a water truck inside the plant on this date. The majority of dust generated on this day was from the slopes of D-Cell and completion of dike work east of our access road. A WDEQ/AQD representative was in the area on this date and verified both the windy and dusty conditions with photographs. The prevailing wind was from the south and the west during this event. (See attached Wind Rose).**

From General Chemical (Soda Ash) Partners High Wind EE demonstration for 4/18/2007 PM₁₀ exceedance at Green River Soda Ash Operation.

Executive Summary

The executive summary may provide a short description of the event, an overview of the demonstration, the legal basis of the submittal, and a description of the facility.

EXECUTIVE SUMMARY

On April 28, 2014 the Leucite TEOM located at Black Butte mine in Sweetwater County, Wyoming recorded 24-hour average concentration of $219.9 \mu\text{g}/\text{m}^3$. This reading is in exceedance of the federal 24-hour PM10 standard. Black Butte believes that this exceedance is the result of an Exceptional Event as determined by the Environmental Protection Agency.

On March 22, 2007 the EPA promulgated the Exceptional Events Rule (EER) to address exceptional events in 40 CFR Parts 50 and 51. The EER allows for states and tribes to “flag” air quality monitoring data as an exceptional event and exclude that data from use in the determination of exceedances or violations of the National Ambient Air Quality Standards (NAAQS), provided the EPA concurs with the demonstration submitted.

This report is intended to provide documentation and support that the exceedance of the $150 \mu\text{g}/\text{m}^3$ 24 hr PM10 standard that occurred at the Black Butte Mine on April 28, 2014 qualifies as an exceptional event under the EER by meeting all requirements set forth in 40 CFR Part 50.14(c)(3)(iii). Black Butte Coal Company contends that the exceedance that was measured on April 28, 2014 was a result of natural events that were not reasonably controllable or preventable. Furthermore, the fugitive dust measured was from ground that is not under the control of Black Butte Coal Co.

Section I of this report provides a history and basic information of the Black Butte mine. As well as providing some background as to when operations were taking place at the Leucite Mine.

Section II of this report is a narrative of events that lead up to and during the event in question. It includes information from notes, reports and eye-witness accounts taken before and during the event. It will provide factual information regarding the overgrazing that occurred on the land surrounding the Leucite TEOM. Details regarding the land conditions that existed off the mine permit area but in the location of the Leucite TEOM are reported in this Section.

Section III of this report details the wind event that occurred on April 28, 2014 and provides the explanation that “the event affected air quality”. This section provides evidence that it was a “natural event”. It also clearly demonstrates the clear causal relationship with the overgrazing conditions that existed off the mine permit area and the wind event.

Section IV of this report provides the factual evidence that despite taking all possible and required actions to prevent and control the event, the event on April 28, 2014 was not reasonably controllable or preventable.

Section V of this report provides the graphical data evidence that the event on April 28, 2014 caused measurement concentrations beyond normal historical fluctuations.

Section VI of this report builds upon the data provided in Sections II through V to provide clear evidence that no exceedance on April 28, 2014 would have occurred “but for” the presence of the natural event.

Section VII of this report provides conclusions and summarizes the exceptional event and how they relate to the rules and requirements in the EER.

Event Summary

Event summaries may include a detailed breakdown of the event including facility operations, site conditions, meteorology, and monitoring data.

Report of NAAQS Exceedance due to Exceptionally High Winds: June 17, 2012

Black Butte Coal Company (BBCC)

Sampler: Pit 10 TEOM

Date of Sample: June 17, 2012

24 Hour PM₁₀ Concentration @ midnight recorded by the Pit 10 TEOM: 413.2 µg/m³

Summary

Black Butte Coal Company (BBCC) is a surface coal mine that utilizes Bucyrus Erie 1570 draglines along with large mining trucks, bulldozers, blades, front end loaders, track hoes, and drills for strip mining operations. In 2011, BBCC delivered over 3 million tons of coal to its customers, moved 39 million yards of overburden to expose coal and moved an additional 12 million yards of topsoil and overburden during reclamation work. The mine operates 24 hours a day with 4 crews working 12 hour shifts on a rotating schedule. Each crew is supervised by a leadman and a field superintendent. Overhead staff includes 1 mine manager, 5 business staff, 7 engineers, and 5 production superintendents. BBCC utilizes the Best Available Control Technology (BACT) strategies across various mine operations for dust control. BACT strategies include, but are not limited to, covered conveyor belts, hopper stilling shed, chemical dust suppressant applications, temporary seeding of topsoil piles, etc. For more detail concerning BACT strategies refer to BBCC's Department Of Environmental Quality Air Quality Division (DEQ-AQD) Permit Application Analysis AP-7424. BBCC also utilizes a PM₁₀ monitoring network consisting of 5 air monitors (TEOM's) that track ambient air conditions throughout the mine.

On June 17, 2012 the 24 hour concentration for the day reported from the Pit 10 TEOM at 12:00am that night was 413.2µg/m³, which exceeded the 150µg/m³ threshold set forth in the National Ambient Air Quality Standards (NAAQS). The following documentation will show mine operations, air quality, and weather data for the June 16, 2012 nightshift as well as the June 17, 2012 dayshift and nightshift.

Operational Summary

As noted in an entry of the Air Monitoring Action Report included in Figure 13, the leadmen of the crews scheduled to work on June 17, 2012 were aware of the wind speeds forecasted for the day. In preparation, a CAT 777D water truck (Cap. 17,700 gal) spent the entire nightshift (staffed by Crew 3) on June 16th watering haul roads and accessible areas around Pit 10. Mining operations in Pit 10 during the nightshift from 6:00pm June 16th to 6:00am June 17th included:

- 1-Bucyrus Eerie 1570 dragline removing overburden from within the pit and adding it to the in-pit spoil piles
- 1-CAT D-10 dozer assisting the dragline
- 2-CAT D-11 dozers which were building a dragline walk road in the northern most portion of Pit 10
- 1-CAT 16M blade performing road maintenance.

On June 17th Crew 1 came on dayshift which lasts from 6:00am to 6:00pm. As is common practice, during the routine lineout meeting at the beginning of dayshift all operators were advised about the potential for extreme weather and asked to report any safety or environmental related issues they observed to the leadman. The CAT 777D water truck continued to apply water around Pit 10 haul roads and accessible areas. Throughout dayshifts on June 17th the second CAT 777D water truck (Cap. 17,700 gal) assisted the 1st water truck in applying water to haul roads and drivable surfaces around Pit 10. The two water trucks spent a total of 12 man hours in the Pit 10 area during the dayshift and applied

Conceptual Model

Narrative conceptual models are comprised of a composite of related concepts which taken together help the reader understand the subject the model represents. The example below explains different aspects and conditions of a stratospheric intrusion.

BACKGROUND

Document Format

The following discussion provides background information on SI's as well the methodology utilized in identifying SI's. Subsequently, the June 6, 2012 event is presented with evidence supporting the premise that an SI occurred creating a period of elevated 1-hour average ozone values resulting in an ozone standard exceedance at the Thunder Basin ozone monitor. The reader is encouraged to examine Appendix A, "Documented Stratospheric Intrusion Events" and Appendix B, "Diagnosis Example" to obtain further information on SI's.

Ground Level Ozone Formation

"Ozone (O_3) is a gas composed of three oxygen atoms. It is not usually emitted directly into the air, but at ground level is created by a chemical reaction between oxides of nitrogen (NO_x) [including nitrogen dioxide (NO_2)] and volatile organic compounds (VOCs) in the presence of sunlight. Ozone has the same chemical structure whether it occurs miles above the earth or at ground level and can be "good" or "bad," depending on its location in the atmosphere." (Source: EPA website). Specifically, NO_2 is split up by ultraviolet (UV) sunlight to give nitric oxide (NO) and an oxygen atom, which combines with molecular oxygen (O_2) to give ozone. Calm winds, or stagnant conditions assist the process of allowing the O_3 precursors of NO_x (NO_2) and VOCs to accumulate in order to produce O_3 . Unlike ozone of stratospheric origin, ground-based ozone typically forms during the daylight hours under stagnant weather conditions (over several days in some cases) and dissipates a few hours after sunset.

Atmospheric Structure

The troposphere is the layer of air adjacent to the earth's surface and contains our weather (i.e. wind, rain, snow, thunderstorms, etc.) The troposphere also contains variable amounts of water vapor and carbon monoxide (CO), extends to a height of roughly 11 km (6.8 mi) AMSL, and varies in depth from the earth's polar regions to the equator. Directly above the troposphere, the stratosphere exists with the tropopause separating the stratosphere from the troposphere. The tropopause is "...usually characterized by an abrupt change of lapse rate¹" (American Meteorological Society 2010).

The stratosphere is the "...region of the atmosphere extending from the top of the troposphere [the tropopause], at heights of roughly 10–17 km...[and] is characterized by constant or increasing temperatures with increasing height and marked vertical stability" (American Meteorological Society 2010).

Composition of Stratospheric Air

"While the major constituents of the stratosphere are molecular nitrogen and oxygen, just as in the troposphere, the stratosphere contains a number of minor chemical species that result from photochemical reactions in the intense ultraviolet radiation environment. Chief among these is ozone..." (American Meteorological Society 2010). While the troposphere contains variable amounts of O_3 , CO, and water vapor, the stratosphere lacks CO and water vapor (Pan, Randel, et

¹ Lapse rate is defined as the change of temperature with the increase of height in the atmosphere.

Control Measures Summary

The facility may make a case for compliance with permit conditions by summarizing the control measures utilized during an event. Demonstrating facility compliance is necessary for satisfying the definition of an Exceptional Event as found in 40 CFR Part 50.1(j), and thus necessary for the acceptance of a demonstration.

Attachment III Summary of Particulate Control Measures

Triton Coal Company employed best available control technology (BACT), best available control measures (BACM) and various reactionary control measures on July 30th in an effort to adequately control mine related PM₁₀ emissions. A detailed discussion of the BACT control measures which are employed daily follows.

Category 1. Best Available Control Technology

North Rochelle employs BACT to ensure mine related PM₁₀ emissions are well controlled. All coal removed from the ground is stored in the covered slot storage or enclosed coal silo. The coal is transported from the coal face to the south near pit crusher via trucks. Active coal and mine haul roads are routinely watered and maintained or chemically treated to reduce emissions. Approximately 3.3 miles of the main coal haul road was being actively treated with chemical dust suppressant. The truck dump is equipped with a stalling shed which has been designed to reduce fugitive emissions while the coal is transferred from the truck to the coal hopper. The stalling shed is a covered, three-sided enclosure and is outfitted with an overhead baffle of rubber belting. A conveyor is employed to transfer coal from the crusher to the enclosed slot storage. This conveyor system reduces the round-trip vehicle miles traveled per truck a distance of 2.7 miles. The conveyor is equipped with a hood and transfer points are enclosed, equipped with a fogger or baghouse system to reduce possible emissions.

Category 2. Additional Best Available Control Measures

Category 2 control measures are implemented on a continuous basis throughout the mine. Most of these control measures are used to reduce wind blown particulates from large contiguous disturbed areas and are especially effective during high wind events. On July 30th winds were fairly normal until the last 2 hours of the day when they increased to around 20 mph. The application of these types of control measures are instrumental in ensuring particulate emissions are well controlled during exceptional and high wind events. The individual control measures are listed below.

- 1) Reclamation is the best defense against wind erosion. North Rochelle Mine works aggressively to reclaim and revegetate disturbed areas as soon as possible. In the spring of 2008, there were approximately 200 acres reseeded. To date there have been over 2,500 acres reclaimed.
- 2) Areas greater than 300 contiguous acres which have been stripped of topsoil, but will not be mined in the near future should be controlled to reduce wind shear at ground level. Topsoil stripping activities are rotated by pit continuously in an effort to limit the amount of contiguous open acres which are prone to wind erosion. To further control wind erosion from larger areas, ripping perpendicular to the primary wind direction is used.
- 3) Graded backfill greater than 300 contiguous acres should be controlled. Reclamation activities are coordinated so that spoil peak areas are not flattened in order to maintain the roughened surfaces. Rough grading activities are coordinated to try and minimize the number of contiguous acres in any one area. Larger areas which are rough graded and cannot be reclaimed immediately are left in a roughened condition or ripped as needed.
- 4) Long-term, out of pit overburden and topsoil stockpiles which have been graded should be controlled. All stripped topsoil is direct hauled to reclamation areas whenever possible and revegetated as soon as possible. Topsoil stockpiling only takes place when it cannot be direct hauled to a lay down area for revegetation. All unvegetated topsoil stockpiles were seeded in the spring of 2008.
- 5) Where appropriate, non-vegetative barriers will be applied to erodible surfaces to reduce surface erosion. Long term equipment yards, parking areas and the road along the conveyor belt line have been rocked to reduce potential dust emissions under windy conditions.
- 6) Pads in front of truck dumps shall be cleaned, treated and maintained to prevent material that accumulates on the pads due to spillage. The pad around the truck dump is cleaned routinely as necessary. An automated sprinkler system has been installed at the south truck dump.

Raw Data

Raw data is essentially the primary source documentation in a demonstration. It provides detailed information on the actual data in question, and, by showing surrounding data points, illustrates the context in which the exceedance occurred. Raw data is typically drawn directly from the EPA's Air Quality System (AQS), and thus may be organized in a number of reporting formats depending on the desired application, but it may also be taken from additional sources such as contractor databases.

EPA's AQS Raw Data Report (AMP 350)

The AMP 350 Raw Data Report shows all collected data for a given date range, parameter(s), and site(s). Flagged data can be shown in the context of overall collected data, as in the example below.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY																											
AIR QUALITY SYSTEM																											
RAW DATA REPORT																											
Apr. 24, 2009																											
(81102) PM10 Total 0-10um STP																											
SITE ID: 56-041-0101 POC: 1														CAS NUMBER: 41.3730966905													
COUNTY: (041) Uinta														LATITUDE: -111.04237594													
CITY: (00000) Not in a city														LONGITUDE: -111.04237594													
SITE ADDRESS: Murphy Ridge LOCATED NEAR WYOMING UTAH BORDER														UTM ZONE:													
SITE COMMENTS:														UTM NORTHING:													
MONITOR COMMENTS:														UTM EASTING:													
SUPPORT AGENCY: (1188) Wyoming Air Quality Division, Dept Of Environmental Quality														ELEVATION-MSL: 2167													
MONITOR TYPE: SPECIAL PURPOSE														PROBE HEIGHT:													
COLLECTION AND ANALYSIS METHOD: (079) INSTRUMENTAL-R&P SA246B-INLET TEOM														DURATION: 1 HOUR													
PQAO ORG: (1188) Wyoming Air Quality Division, Dept Of Environmental Quality														UNITS: Micrograms/cubic meter (25 C)													
HOUR														MIN DETECTABLE: -50													
DAY	0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	OBS	MAXIMUM	
1	5	4	5	4	4	6	7	9	10	9	7	7	7	5	7	8	12	9	7	7	8	7	7	6	24	12.	
2	7	6	6	8	9	6	6	7	7	6	7	6	6	5	5	3	6	7	6	6	7	7	6	7	24	9.	
3	5	5	6	8	5	3	5	8	9	9	9	7	2	8	7	5	8	10	10	8	8	10	10	9	24	10.	
4	10	9	9	8	9	9	10	14	13	7	8	7	6	8	10	11	13	15	11	13	12	13	13	17	24	17.	
5	19	20	15	19	20	23	24	23	22	20	15	8	9	9	11	9	7	7	7	7	7	7	7	7	24	24.	
6	8	8	7	7	8	10	10	9	9	8	9	7	9	8	10	8	9	9	9	9	7	7	7	7	24	10.	
7	6	6	5	7	4	4	6	6	6	7	8	4	6	15	12	14	12	12	12	11	11	10	8	7	24	15.	
8	9	6	6	5	6	5	8	7	9	9	5	5	10	13	18	18	19	20	21	24	20	14	12	9	24	24.	
9	4	5	11	11	11	10	7	7	10	12	14	13	14	9	5	9	9	9	11	7	4	5	6	7	24	14.	
10	5	5	7	6	6	7	8	7	6	7	7	6	6	8	8	11	12	13	14	11	10	7	7	7	24	14.	
11	6	5	8	6	7	7	7	6	6	6	6	7	6	6	7	7	7	9	10	10	10	9	9	10	24	10.	
12	10	8	9	9	9	9	11	12	10	10	10	11	10	10	8	9	10	10	12	10	13	11	11	14	24	14.	
13	11	10	10	9	9	8	9	8	12	11	8	9	8	6	5	4	3	5	8	12	12	11	3	5	24	12.	
14	5	5	5	4	5	5	6	8	10	8	6	7	5	5	6	8	12	23	32	86	203	278	201	100	24	278.	
15	84	52	39	78	220	314	304	374	230	194	182	115	45	15	18	8	13	16	12	29	25	28	19	9	24	374.	
16	11	13	11	12	13	13	17	15	16	15	11	8	10	5	7	9	12	10	14	10	8	8	7	8	24	17.	
17	8	7	6	7	6	9	9	14	8	10	7	9	9	23	9	11	13	19	18	17	16	16	14	17	24	23.	
18	17	16	17	17	17	15	17	19	15	12	11	15	14	13	15	19	19	21	22	20	29	35	45	82	24	82.	
19	71	46rj	25rj	16rj	14rj	15rj	14rj	16rj	9rj	17rj	17rj	15rj	16rj	35rj	237rj	451rj	433rj	455rj	508rj	463rj	375rj	218rj	230rj	81rj	24	508.	
20	61	59	57	34	21	21	34	50	120	111	73	55	102	63	66	38	36	27	19	22	53	67	65	35	24	120.	
21	18	30	28	16	17	18	22	18	4	16	15	16	15	16	17	19	22	13	17	11	13	13	12	16	24	30.	
22	17	16	21	19	17	18	22	20	18	21	9	16	19	20	15	14	15	15	25	15	11	10	12	12	24	25.	
23	13	10	13	12	11	11	14	19	16	13	29	AM	4	11	OV	4	13	OV	OV	20	8	7	9	11	23	29.	
24	17	12	6	8	5	5	9	12	10	9	7	6	13	10	9	3	6	5	OV	8	6	9	10	16	24	17.	
25	11	9	8	7	7	12	11	8	5	6	6	5	7	8	8	14	14	13	14	17	27	27	20	15	24	27.	
26	17	11	9	8	8	7	10	7	7	7	8	9	10	12	12	19	22	20	17	19	18	17	14	14	24	22.	
27	15	15	14	13	13	12	15	15	13	16	19	18	14	16	15	17	17	15	18	23	24	22	21	20	24	24.	
28	19	18	19	18	18	16	15	15	17	16	16	17	19	21	22	20	21	21	16	18	19	18	19	18	24	22.	
29	18	14	18	17	18	16	18	18	17	19	20	21	26	34	28	33	66	92	93	56	71	59	92	109	24	109.	
30	172	148	157	146	116	91	55	72	47	53	30	49	28	21	12	19	15	13	8	11	16	23	26	31	24	172.	
31																									0		
NO.	30	30	30	30	30	30	30	30	30	30	29	30	30	30	30	30	30	30	30	30	30	30	30	30	30		
MAX:	172.	148.	157.	146.	220.	314.	304.	374.	230.	194.	182.	115.	102.	63.	237.	451.	433.	455.	508.	463.	375.	278.	230.	109.			
AVG:	22.6	19.3	18.6	18.0	21.0	23.5	23.7	27.5	23.0	22.1	19.3	16.6	15.2	14.6	20.2	27.4	29.2	30.3	32.4	32.7	35.1	32.5	30.7	23.5			
MONTHLY OBSERVATIONS: 719 MONTHLY MEAN: 24.1 MONTHLY MAX: 508.																											
Note: Qualifier codes with regional concurrence are shown in upper case, and those without regional review are shown in lower case. An asterisk (**) indicates that the region has reviewed the value and does not concur with the qualifier.																											

EPA's AQS Max Values Report (AMP 350MX)

The AMP 350MX Raw Data Max Values Report shows the daily rolling average of collected data for a given date range, parameter(s), and site(s).

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY												
AIR QUALITY SYSTEM												
RAW DATA MAX VALUES REPORT												
May. 24, 2013												
(88101) PM2.5 - Local Conditions						CAS NUMBER:						
SITE ID: 56-035-0101 POC: 1						LATITUDE: 42.8698240009						
COUNTY: (035) Sublette						LONGITUDE: -109.87076						
CITY: (00000) Not in a city						UTM ZONE:						
SITE ADDRESS: Pinedale Gaseous Monitor on west side of City Park and Pine Creek						UTM NORTHING:						
SITE COMMENTS:						UTM EASTING:						
MONITOR COMMENTS:						ELEVATION-MSL: 2191						
SUPPORT AGENCY: (1188) Wyoming Air Quality Division, Dept Of Environmental Quality						PROBE HEIGHT:						
MONITOR TYPE: Multiple Monitor Types						REPORT FOR: 2012						
COLLECTION AND ANALYSIS METHOD: (170) Met One BAM-1020 Mass Monitor w/VS						DURATION: 24-HR BLK AVG						
PQAO: (1188) Wyoming Air Quality Division, Dept Of Environmental Quality						UNITS: Micrograms/cubic meter (LC)						
						MIN DETECTABLE: 2						
MONTH												
Day	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
1						2.6	17.0					
2						4.8	15.9					
3						5.5	17.6					
4						7.4	10.1					
5						7.4	13.8					
6						3.9	9.4					
7						5.6	9.6					
8						4.5	7.2					
9						4.9	7.1					
10						3.0	8.9					
11						4.2	8.7					
12						4.1	9.5					
13						4.7	9.1					
14						4.7	11.5					
15						4.5	11.3					
16						5.3	7.5					
17						5.3	5.0					
18						8.0	7.5					
19						3.6	4.6					
20						4.1	8.1					
21						2.7	6.2					
22						7.4	7.0					
23						5.9	7.2					
24						11.5	7.9					
25						11.5	6.0					
26						P 47.0 +	6.2					
27						19.5	5.4					
28						29.9	5.1					
29						18.5	5.2					
30						17.4	6.6					
31												
NO.:	0	0	0	0	0	30	30	0	0	0	0	0
MAX:						47.0	17.6					
MEAN:						8.98	8.74					
ANNUAL OBSERVATIONS:	60					ANNUAL MEAN: 8.86	ANNUAL MAX: 47.0					
Note: A plus sign ("+") following a value indicates that the computed average includes one or more raw data values effected by a special event.						1 Values marked with 'P' exceed the PRIMARY STANDARD of: 35.5						
						1 Values marked with 'S' exceed the SECONDARY STANDARD of: 35.5						

Page 1 of 1

From Air Quality Division Fire EE demonstration for June-July 2012 PM2.5 exceedance at multiple monitors.

EPA's AQS Quick Look (AMP 450)

The AMP 450 Quicklook Criteria Parameters Report provides a good overview of a given criteria pollutant for a site(s) compared to its NAAQS.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY AIR QUALITY SYSTEM QUICK LOOK REPORT (AMP450)																	
Mar. 7, 2012																	
Sulfur dioxide (42401)																	
Wyoming																	
Parts per billion (008)																	
SITE ID	P O C	POAO	CITY	COUNTY	ADDRESS	YEAR	METH	OBS	COMP QTRS	1ST MAX 1-HR	2ND MAX 1-HR	99TH PCTL 1-HR	1ST MAX 24-HR	2ND MAX 24-HR	Days MAX >24HR STD	ARITH MEAN AN-STD	CERT EDT
56-013-0099	1	1188	Not in a city	Fremont	South Pass WyDot	2007	009	6097	2	10.0	4.0	3.0	2.1	1.3	0	.38*	0
56-013-0099	1	1188	Not in a city	Fremont	South Pass WyDot	2008	009	7632	3	12.0	9.0	5.0	3.2	1.3	0	.06*	0
56-013-0099	1	1188	Not in a city	Fremont	South Pass WyDot	2009	009	5329	2	7.0	6.0	4.0	.7	.7	0	.05*	0
56-021-0100	1	1188	Not in a city	Laramie	6909 Chief Washakie Ave. North Cheyenne Soccer Complex	2011	600	5954	3	19.0	9.0	4.0	2.2	1.0	0	.24*	0
56-037-0200	1	1188	Not in a city	Sweetwater	WAMSUTTER SOUTHEAST PORTION OF SWEETWATER COUNTY	2007	009	8137	4	10.1	9.9	8.3	2.3	2.2	0	.57	0
56-037-0200	1	1188	Not in a city	Sweetwater	WAMSUTTER SOUTHEAST PORTION OF SWEETWATER COUNTY	2008	009	8246	4	10.8	9.6	7.5	2.5	2.2	0	.59	0
56-037-0200	1	1188	Not in a city	Sweetwater	WAMSUTTER SOUTHEAST PORTION OF SWEETWATER COUNTY	2009	009	8172	4	7.0	6.9	6.8	1.6	1.5	0	.30	0
56-037-0300	1	1188	Not in a city	Sweetwater	Moxa	2010	009	4192	2	40.2	20.9	20.9	8.4	3.8	0	.91*	0
56-037-0300	1	1188	Not in a city	Sweetwater	Moxa	2011	009	6233	3	29.7	21.8	18.4	4.6	3.7	0	.60*	0

Note: The * indicates that the mean does not satisfy summary criteria.

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From Sinclair Wyoming Refining Company Gaseous EE demonstration for 4/23/2012 SO₂ exceedance at the Sinclair Refinery.

Raw Meteorological Data (Non-AQS Source)

Raw data is collected by contractors and is stored temporarily in contractor-controlled databases before validation and entry into AQS. The following is an example of raw data collected by a contractor for wind speed. Because they are designed and maintained by contractors, Non-AQS databases may be more versatile in terms of creating usable technical products.

Powder River Coal Company North Antelope/Rochelle Mine Site Air Monitoring Summary Wind Speed (miles per hour) January 2007																																		
Day	<< Hour >>																								Avg	Max	Min							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24										
1	6	4	4	5	5	2	4	2	5	4	5	11	9	9	7	6	8	8	6	4	6	4	10	9	6	11	2							
2	9	8	10	12	7	10	7	10	9	15	23	18	9	21	28	13	8	18	12	6	16	19	21	20	14	28	6							
3	22	25	19	20	30	26	24	14	23	23	18	15	27	25	27	29	39	39	28	33	29	27	23	25	25	39	14							
4	21	29	27	22	17	20	25	25	29	31	28	21	17	18	14	13	10	7	7	8	7	10	9	13	18	31	7							
5	14	15	13	19	14	12	9	5	10	11	16	24	25	23	21	18	14	10	8	6	4	5	4	7	13	25	4							
6	14	19	23	18	24	24	30	34	38	41	47	46	46	39	36	32	23	26	25	20	29	35	25	27	30	47	14							
7	25	21	28	27	16	17	19	18	23	23	22	22	27	28	29	34	33	29	28	31	32	30	32	31	26	34	16							
8	31	29	27	25	18	18	12	13	13	25	36	45	44	38	33	29	25	17	22	22	18	16	14	16	24	45	12							
9	13	9	4	3	4	4	5	8	7	5	8	21	26	29											10	29	3							
10																																		
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31																																		
Avg	17	18	17	17	15	15	15	14	17	20	23	25	26	26	24	22	20	19	17	16	18	18	17	19	19	32	9							
Max	31	29	28	27	30	26	30	34	38	41	47	46	46	39	36	34	39	39	28	33	32	35	32	31	30	47	16							
Min	6	4	4	3	4	2	4	2	5	4	5	11	9	9	7	6	8	7	6	4	4	4	4	7	6	11	2							

From Powder River Coal, LLC High Wind NEAP demonstration for 1/8/2007 PM₁₀ exceedance at North Antelope Rochelle Mine.

Raw Meteorological Data (Non-AQS Source)

Another example of contractor-sourced raw data, this time submitted in a form that allows for user manipulation.

K14									
	A	B	C	D	E	F	G	H	I
1	OCI Chemical Corporation								
2	Ambient Particulate Matter								
3	Concentration Summary								
4	7/6/2009 - 6/30/2014								
5	Sample Concentrations at STP ($\mu\text{g}/\text{m}^3$)								
6			>150			>45	>40		>3
7			>75			>35	>30		
8			>40						Consecutive
9	Sampler ID:	3B	4B	4C	Inst. Max	Hourly	WD for		Hours
10	Sampler Type:	PM ₁₀	PM ₁₀	PM ₁₀	WS	Max WS	Hourly		>25 mph
					(mph)	(mph)	max WS		
299	03/24/14	10	11	12	29.3	25.1	272.3		
300	03/30/14	10	8	9	33.7	29.7	257.6	3	
301	04/05/14	5	5	5	17.4	11.2	251.9		
302	04/11/14	10	12	11	29.3	26.3	254.1		
303	04/17/14	12	9	12	17.3	14.2	245.0		
304	04/23/14	4	5	5	28.9	26.6	242.9		
305	04/29/14	5	6	7	21.5	12.8	14.5		
306	05/05/14	24	22	24	24.9	21.8	262.0		
307	05/11/14	35	8	10	33.5	29.3	37.9	5	
308	05/17/14	12	12	11	22.6	17.2	269.7		
309	05/23/14	9	8	8	24.0	19.0	127.9		
310	05/29/14	21	21	25	31.7	14.8	291.4	0	
311	06/04/14	23	9	26	24.7	16.7	281.2		
312	06/10/14	39	Invalid	186	54.5	33.2	251.5	4	
313	06/16/14	14	14	15	19.6	17.5	239.2		
314	06/22/14	13	13	13	24.0	15.7	301.9		
315	06/28/14	7	9	11	27.4	23.1	256.6		
316	Ave.	11.6	12.1	13.2	22.2	17.7			
317	Max.	95	66	186	66.2	43.3			
318									
319									
320	Arithmetic Mean	11.6	12.1	13.2					
321	Highest sample	95	66	186					
322	2nd highest sample	47	55	67					
323									
324	Sample recovery	97.4%	96.7%	94.4%					
325									
326	Network sample recovery		96.2%						
327									

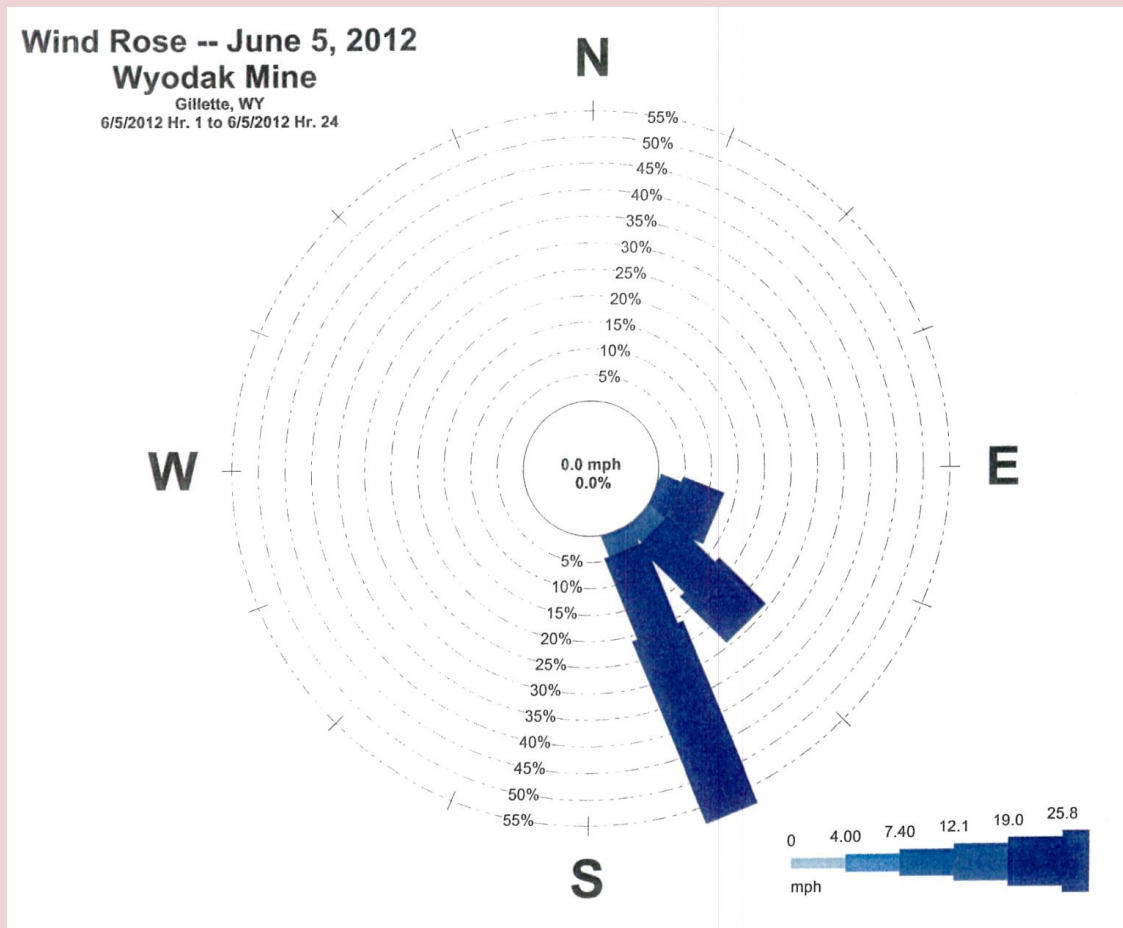
From OCI Wyoming, LLC High Wind EE demonstration for 6/10/2014 PM₁₀ exceedance at OCI facility.

Roses

Roses are a visual representation of the relative frequency of a given parameter (usually wind speed or pollution quantities) and direction over a given time period. The resultant weights and lengths of the radial bars give the reader a clear indication of where wind or pollution came from during a certain timeframe.

Wind Rose

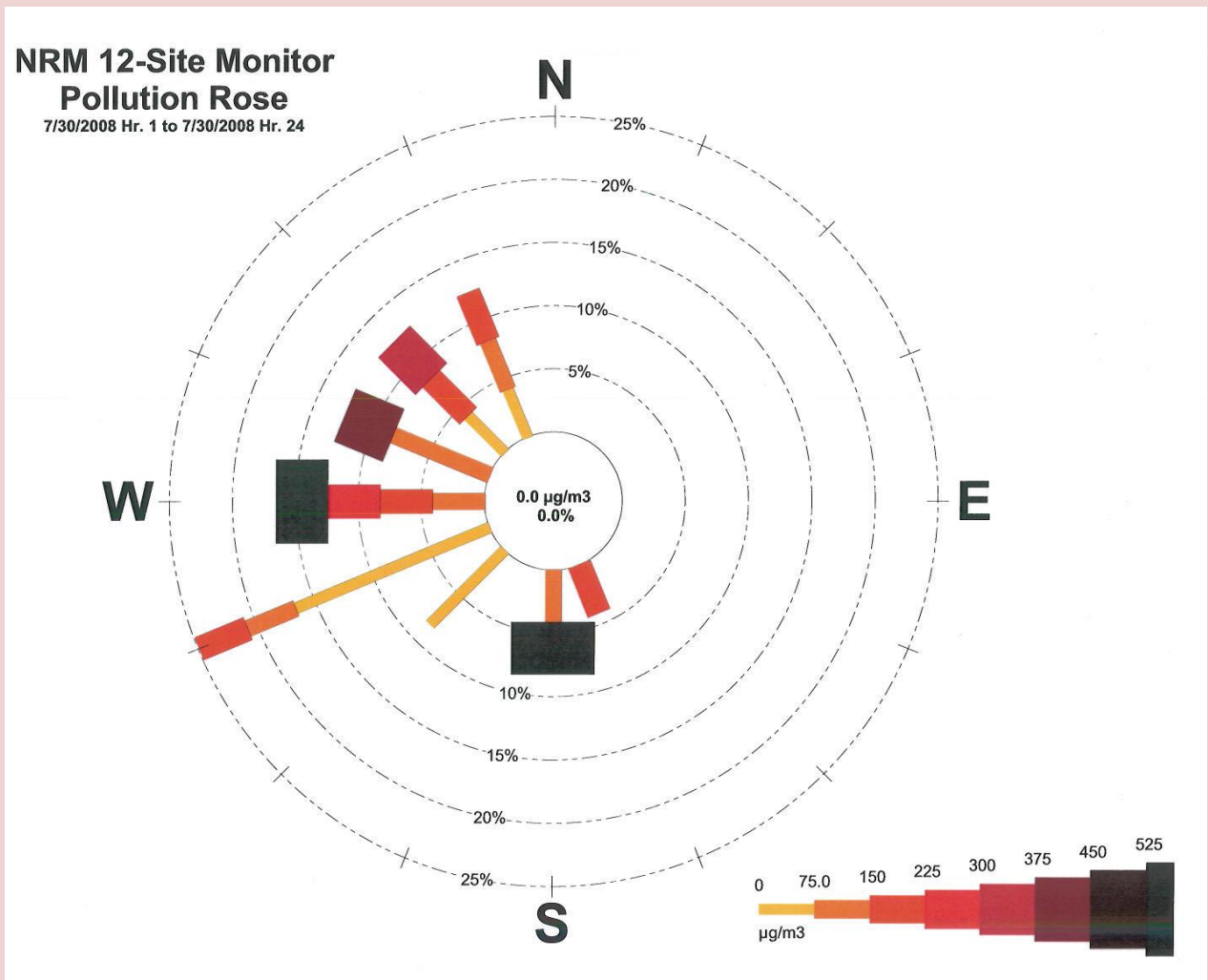
Plotting wind speed against wind direction over a given time period, a wind rose gives a visual indication of the direction and strength of prevailing winds. The differing weights of bars correlate to different wind speeds, while the length indicates the relative frequency, by percent, of a given direction and speed of wind.



From Wyodak Resources Development Corp. High Wind EE demonstration for 6/5/2012 PM₁₀ exceedance at Wyodak Mine.

Pollution Rose

Plotting pollution against direction over a given time period, a pollution rose gives a visual indication of the source and strength of air-borne pollutants. The differing weights of bars correlate to different pollution concentrations, while the length indicates the relative frequency, by percent, of a given direction from which pollution arrives at a sampler.



From Triton Coal Company, LLC Fire EE demonstration for 7/30/2008 PM₁₀ exceedance at North Rochelle and Black Thunder Mines.

Tables

Tables show data in an organized and easy-to-read format. They allow individual parameters to be presented clearly, or they can be used to demonstrate correlations between multiple parameters.

Meteorological Data Summary

Tabular meteorological data summaries give a quick snapshot of data collected over a given time period.

Summary of Selected Meteorological Data Mountain Cement West Station Preliminary Validation 01/01/2009 - 01/31/2009				
Parameter	Value	Units	Number	Std Dev
SCALAR WIND SPEED				
Average	6.4	m/s	744	3.7
Maximum	19.2	m/s		
Percent calm = 0.00				
AMBIENT TEMPERATURE				
Average	-3.4	degC	744	7.3
Maximum	11.7	degC		
Minimum	-32.7	degC		
RELATIVE HUMIDITY				
Average	NA			
Maximum				
Minimum				

From Mountain Cement Company High Wind EE demonstration for 1/7/2009 PM10 exceedance at Mountain Cement.

Meteorological Data vs. Particulate Matter Data

Organizing pollutant data against meteorological data, particularly wind speed and direction, is a good way to show correlation in a high wind demonstration. The example below highlights high measured concentrations and corresponding wind data.

Date	Time	Sec. 12 TEOM Hourly PM ₁₀ Conc. (STP µg/m ³)	JR-5 TEOM Hourly PM ₁₀ Conc. (STP µg/m ³)	Sec. 36 TEOM Hourly PM ₁₀ Conc. (STP µg/m ³)	Sec 12 Met station avg. hourly wind speed (mph)	Sec 12 Met station max. hourly wind gust (mph)	Sec 12 Met station wind direction (degrees)	Admin Met station avg. hourly wind speed (mph)	JRM Met station avg. hourly wind speed (mph)
3-Mar-13	100	12.3	10.9	11.8	5.1	11.2	198	4.7	6.8
3-Mar-13	200	10.4	25.4	13.2	11.9	19.9	204	8.4	9.7
3-Mar-13	300	13.8	33.6	11.4	12.4	18.9	205	4.4	9.7
3-Mar-13	400	10.1	24.1	12.1	12.2	24.1	234	5.2	8.8
3-Mar-13	500	9.2	7.4	17.6	12.2	26.9	287	4.6	7.3
3-Mar-13	600	10.2	5.9	32.4	6.5	10.5	285	4.4	6.7
3-Mar-13	700	12.1	6.7	47.5	6.8	8.9	267	5.4	11.9
3-Mar-13	800	20.9	5.9	18	7.4	13.4	282	7.5	10.9
3-Mar-13	900	25.8	12.2	14.7	7.4	12.6	277	6	10
3-Mar-13	1000	7.3	15.3	32.3	14.9	23.7	259	9	9.6
3-Mar-13	1100	5.7	4.2	29	18.7	25.6	257	12.7	14
3-Mar-13	1200	5.8	1.9	17.7	15.6	25.7	257	8.8	13.7
3-Mar-13	1300	3.6	4.3	10.2	18.4	29.9	268	9.4	12.2
3-Mar-13	1400	4.5	1.3	7.5	16.1	25.3	269	9	10
3-Mar-13	1500	5.2	6.1	17.3	18.8	31.2	265	12.9	13.3
3-Mar-13	1600	28.1	1.6	31.1	24.2	33.5	249	13.5	9.3
3-Mar-13	1700	27.7	10.9	27.2	26.1	39.9	251	19	18.8
3-Mar-13	1800	25.6	14.5	10.8	19.7	30.2	250	15.1	19.3
3-Mar-13	1900	11.3	30.6	9.8	22.1	34.2	249	14.9	16.3
3-Mar-13	2000	447.2	98.6	574.4	31.2	49.2	310	27.2	39.1
3-Mar-13	2100	71.9	39.5	57.3	28.1	45.3	332	25.5	35.9
3-Mar-13	2200	28.2	5.2	26.3	28.3	42.5	332	20.1	34
3-Mar-13	2300	18.4	16.8	24.4	24.6	35.7	332	17.8	28.5
3-Mar-13	2400	11.1	24	16.1	21.8	33.6	333	19.9	21.5
4-Mar-13	100	12.6	6.6	13.6	18	27.1	319	15	18.6
4-Mar-13	200	9.2	2.9	12.3	16.4	24.4	315	13.2	17.4
4-Mar-13	300	6.5	3.4	13.9	15.8	21.9	312	8.1	13.2
4-Mar-13	400	15.4	19.4	7.8	15.1	26.7	319	12.6	21
4-Mar-13	500	15	11.8	21.4	19.8	31.1	309	13.6	24.8
4-Mar-13	600	23.7	9.6	14.3	20.9	33.1	312	17.8	23.6
4-Mar-13	700	31.7	17.7	13.7	23.7	37.3	318	15.6	24.8
4-Mar-13	800	100.7	18.7	134.7	29.1	45	318	24.2	30.4
4-Mar-13	900	178.4	61.1	235.2	34.1	51.6	317	26.1	36.5
4-Mar-13	1000	463.8	119.2	1064.1	40.8	59.2	316	34.8	39.7
4-Mar-13	1100	150.7	97.8	533.9	41.5	55.5	314	29.5	37.5
4-Mar-13	1200	135.9	93.9	460	42	56.6	314	30.3	40.1
4-Mar-13	1300	154.6	177.7	395.9	39.3	54.4	315	28.7	31.3
4-Mar-13	1400	264	113	358.9	41.5	57.7	318	31.3	39
4-Mar-13	1500	181.5	115.3	202.6	37.6	54	322	28.7	40
4-Mar-13	1600	119.9	148.4	255.2	34.4	53.1	316	29.9	38.3
4-Mar-13	1700	104.4	109.7	138	31.2	46.7	320	29.5	35.7

From Thunder Basin Coal Company, LLC High Wind EE demonstration for 3/4/2013 PM₁₀ exceedance at the Black Thunder Mine.

Meteorology, Particulate Matter, and Action Taken

The inclusion of actions taken by a facility can help demonstrate facility compliance during an event, adding another element to pollution concentration and meteorological data by demonstrating the correlation between pollutant levels and action taken.

Date/Time	Wind Speed / Direction	Hourly PM10 I-80/Pit 10	24-Hour PM10 I-80/Pit 10	Actions
3/15/13 06:00 am	3.6/12	17.1 / 11.7	33.2 / 17.8	Drag #1 operating in Pit 11. Truck fleet stripping topsoil in Pit 10. Water trucks operated and assigned to cover Pit 10 and 11 prestrip, spoils and highwall areas.
3/15/13 12:30 pm	19.5/268	401.8 / 116.2	53.6 / 28.6	All Pit 10 and Pit 11 operations were idled due to high winds and resulting high PM10 readings.
3/15/13 02:30 pm	20.6/271	106.9 / 56.7	67.8 / 37.4	Pit 10 truck operations returned to work.
3/15/13 06:00 pm	18.8/270	93.7 / 30	68.9 / 44.3	All Pit 10 and 11 operations idled. Water trucks were assigned to cover Pit 10 and 11 spoils, prestrip and highwall areas.
3/16/13 01:00 am	2.3/44	12 / 10.2	64.1 / 42.4	Drag #1 returned to operation in Pit 11. Idled 81 water truck for rest of shift.
3/16/13 06:00 am	1.3/69	13.3 / 12.3	63.3 / 42.3	Pit 11 operations in operation at start of shift. Both water trucks put into service to address Pit 10 and 11 prestrip, spoils and highwall areas.
3/16/13 01:30 pm	24/265	351.3 / 69.8	48.6 / 29.8	Pit 11 operations idled due to high PM10 readings. Water trucks continued to operate in Pit 10 and 11.
3/16/13 06:00 pm	20/280	9.8 / 28.7	44.9 / 28.9	Pit 11 operations idled due to high PM10 readings. Water trucks continued to operate in Pit 10 and 11.
3/16/13 08:00 pm	12.5/255	11.1 / 17.5	44 / 28.5	Drag #1 returned to operation in Pit 11.
3/17/13 05:00 am	19.8/245	164.4 / 168.9	50.4 / 33.6	Drag #1 was idled due to high winds.
3/17/13 06:00 am	15.4/228	9.6 / 10.7	50.4 / 33.8	Drag #1 returned to service in Pit 11. Water trucks did not operate due to snow and poor road conditions.
3/17/13 01:30 pm	31.1/266	1871 / 447.2	127.9 / 54.8	Drag #1 was idled due to high PM10 readings.
3/17/13 02:00 pm	35.2/262	1375 / 316.2	176.3 / 63.2	Water trucks were put into service after evaluation of road conditions determined they were safe for truck traffic. Assigned to cover Pit 10 and 11 prestrip, spoils, out-of-pit stockpiles and highwall areas. Drag #2 was idled due to high winds.
3/17/13 06:00 pm	33.1/281	66.7 / 328.8	438 / 255.9	All operations remained idled. Water trucks continued to work in Pit 10 and 11 prestrip, spoils, out-of-pit spoils and highwall areas.
3/18/13 12:00 am	7.9/259	35 / 40.4	431.8 / 260.3	Put Drag #2 back in operation.
3/18/13 06:00 am				Pit 10 and 11 operations remained idled. Notifications made to WYDEQ-AQD. Continued to operate water trucks throughout mine.

From Black Butte Coal Company High Wind EE demonstration for 3/17/2013 PM10 exceedance at the Black Butte Mine.

Meteorological Data

Meteorological data summaries provide a broad overview of ambient conditions during an event.

DATE	Year	Julian Date	Time	Wind Speed (mph)	Vector mean WD	Mod Sigma-Theta	MAX Wind Speed (mph)	MIN Wind Speed (mph)	Temperature	Precipitation (in)	Barometric Pressure	RH temp	Relative Humidity	Battery Voltage	Temp daily avg
04/18/07	2007	108	100	19.34	149.7	5.017	24.82	12.18	44.5	0	23.5	44.5	71.1	14.06	
04/18/07	2007	108	200	16.25	153.1	4.213	21.62	12.37	44.4	0	23.48	44.29	68.75	14.06	
04/18/07	2007	108	300	16.41	144.1	4.558	19.79	12.64	44.51	0	23.46	44.52	66.93	14.06	
04/18/07	2007	108	400	16.6	147.5	5.078	21.85	12.09	43.42	0	23.43	43.41	68.81	14.06	
04/18/07	2007	108	500	18.7	140.3	4.487	22.58	14.2	42.68	0	23.42	42.66	68.03	14.06	
04/18/07	2007	108	600	19.42	144.7	5.45	29.13	13.24	47.11	0	23.41	47.08	57.88	14.06	
04/18/07	2007	108	700	25.67	155.4	6.858	38.15	15.43	51.91	0	23.39	51.98	44.22	14.06	
04/18/07	2007	108	800	33.55	168.5	8.78	43.33	19.74	54.74	0	23.38	54.86	32.05	14.06	
04/18/07	2007	108	900	32.19	179.8	9.14	45.25	15.34	55.88	0	23.36	56.02	25.64	14.06	
04/18/07	2007	108	1000	32.83	174.9	11.17	48.18	19.1	56.72	0	23.34	56.78	23.3	14.05	
04/18/07	2007	108	1100	35.79	175.9	10.45	51.52	21.3	57.44	0	23.32	57.59	23.77	14.05	
04/18/07	2007	108	1200	24	232	19.55	46.67	5.679	51.59	0	23.33	51.93	39.84	14.05	
04/18/07	2007	108	1300	25.51	277.2	7.87	39.62	12.32	44.38	0	23.33	44.57	65.35	14.06	
04/18/07	2007	108	1400	35.67	271.4	6.904	51.25	20.33	37.97	0	23.33	38.27	82.5	14.07	
04/18/07	2007	108	1500	27.75	273.3	6.965	43.69	14.06	33.69	0	23.35	33.77	93.9	14.07	
04/18/07	2007	108	1600	22.88	275.1	6.541	33.16	14.84	30.48	0	23.39	30.34	100	14.08	
04/18/07	2007	108	1700	19.45	281.5	8.04	34.35	10.72	29.82	0	23.42	29.25	100	14.08	
04/18/07	2007	108	1800	15.42	287.2	13.29	28.72	6.778	28.5	0	23.43	28.15	100	14.08	
04/18/07	2007	108	1900	11.93	249.2	14.07	22.4	3.206	28.83	0	23.44	27.55	100	14.08	
04/18/07	2007	108	2000	14.02	260.8	8.51	24.96	5.267	28.57	0	23.44	27.64	98.3	14.08	
04/18/07	2007	108	2100	12.89	228.9	7.17	19.24	5.679	28.45	0	23.43	27.84	96.8	14.08	
04/18/07	2007	108	2200	12.62	241.6	7.04	20.84	7.28	27.26	0	23.44	26.83	93.7	14.08	
04/18/07	2007	108	2300	17.73	240.5	6.569	24.64	10.85	26.21	0	23.45	25.99	93.2	14.08	
04/18/07	2007	108	2400	14.48	237.9	7.09	22.26	8.34	25.45	0	23.46	25.24	93	14.08	40.19

From Solvay Chemicals High Wind EE demonstration for 4/18/2007 PM10 exceedance at Solvay Minerals Plant.

Relative Frequency (% of Recorded Winds)

The basis of wind and pollution roses is data from tables displaying the relative frequency of wind speeds, or pollution concentrations, at incremental wind directions. The example below is for a wind rose.

Laramie River Station Wheatland, WY Substituted Chugwater Met Data 1/5/2007 Hr. 0 to 1/8/2007 Hr. 0									
RELATIVE FREQUENCY (% of Recorded Winds) TABLE									
Wind Direction	mph								Row Total
	0.0- 5.0	5.0-10.0	10.0-15.0	15.0-20.0	20.0-25.0	25.0-30.0	30.0-35.0	35.0-above	
0.0 deg.(North)		1.7	6.0	2.9					10.6
22.5 deg.		1.0	4.6	2.4					7.9
45.0 deg.			0.2	0.2					0.5
67.5 deg.									0.0
90.0 deg.									0.0
112.5 deg.									0.0
135.0 deg.									0.0
157.5 deg.			0.2						0.2
180.0 deg.	0.2		0.2						0.5
202.5 deg.			0.2	0.5					0.7
225.0 deg.			0.2						0.2
247.5 deg.			1.2	2.4	1.9	0.7	0.2		6.5
270.0 deg.		0.5	3.1	2.6	5.8	5.5	3.8	4.3	25.7
292.5 deg.		1.0	5.3	7.0	5.5	5.0	3.4	3.4	30.5
315.0 deg.		1.2	3.6	3.6	2.9	1.2	0.7		13.2
337.5 deg.	0.2	1.2	1.4	0.2		0.2			3.4
	0.5	6.5	26.4	21.9	16.1	12.7	8.2	7.7	100.0
0 mph (0.0%)	INVALID READINGS 16								
NUMBER OF POSSIBLE READINGS 432			VALID READINGS 416			DATA CAPTURE 96.30%			

From Basin Electric Power Cooperative High Wind EE demonstration for 1/6/2007 PM₁₀ exceedance at Laramie River Station.

Particulate Matter 24-Hour vs. Year to Date (YTD) and Quarterly Mean Values

Comparing YTD and 24-Hour data across multiple sites can help geographically and temporally contextualize measured concentrations. Including data from upwind or downwind monitors or neighboring facilities' data as in the example below is a good way to demonstrate the local or regional influence of an event.

Table 1: PM₁₀ Concentrations (@STP) near Antelope Mine, 15 Sept. 2012

SITE	SAMPLER	MEASURED 24-HOUR CONCENTRATION	2012 MEAN CONC.	3Q12 MEAN CONC.
ACM 881	4PM10	30 µg/m ³	24.5 µg/m ³	41.7 µg/m ³
ACM 850	5PM10	60 µg/m ³	34.1 µg/m ³	51.6 µg/m ³
ACM 851	6PM10	157 µg/m ³	38.2 µg/m ³	61.6 µg/m ³
NARM	RO-1	invalid	56.8 µg/m ³	66.8 µg/m ³
NARM	NA-7	52 µg/m ³	24.8 µg/m ³	42.0 µg/m ³
NARM	NA-8	91 µg/m ³	32.6 µg/m ³	48.4 µg/m ³

From Cloud Peak Energy High Wind EE demonstration for 9/15/2012 PM₁₀ exceedance at Antelope Mine.

Cumulative Percentiles of Data

Calculating and displaying the cumulative percentile of a given concentration can help satisfy the section of the EER that states, “the event is associated with a measured concentration in excess of normal historical fluctuations, including background.”

Big Piney

During June-July, Big Piney recorded eight (8) exceedances of the 24-hour $PM_{2.5}$ NAAQS and one (1) exceedance of the 24-hour PM_{10} NAAQS:

Table 3: Big Piney Exceedances

Date	Value ($\mu\text{g}/\text{m}^3$)	Parameter
6/28/2012	54	$PM_{2.5}$
6/29/2012	111	$PM_{2.5}$
6/30/2012	144	$PM_{2.5}$
6/30/2012	190	PM_{10}
7/1/2012	85	$PM_{2.5}$
7/2/2012	97	$PM_{2.5}$
7/3/2012	75	$PM_{2.5}$
7/4/2012	68	$PM_{2.5}$
7/5/2012	38	$PM_{2.5}$

The Big Piney Station is one of the AQD's mobile monitoring stations and has been operating at Big Piney since March 2011. Data used for the statistical comparisons are from June and July 2011 and 2012. Cumulative percentiles are used to show the relative ranking (in percent) of the exceedance values compared to the rest of the data collected. $PM_{2.5}$ exceedances monitored in June are in the 96th% and above (i.e. top 4% of all days monitored in June of 2011 and 2012); $PM_{2.5}$ exceedances monitored in July are in the 93rd% and above.

Big Piney $PM_{2.5}$ Month of June 2011-2012

Value	Count	Cumulative Percent
54	1	96
111	1	98
144	1	100

From Air Quality Division Fire EE demonstration for June 26 to July 5, 2012 $PM_{2.5}$ and PM_{10} exceedances at multiple sites.

Emissions in Tons

The following table shows daily emissions from large wildfires believed to contribute to exceedances at multiple monitors. These data were sourced from the Western Regional Air Partnership's Fire Emissions Tracking System (FETS).

Table 2: PM_{2.5} Emissions in Tons

Date	Fontenelle Wildfire	Arapaho Wildfire	Ash Creek Wildfire	Seeley Wildfire	Cato Wildfire
6/26/2012	837	0	6975	251	523
6/27/2012	7319	0	12205	6020	3959
6/28/2012	2547	724	0	330	0
6/29/2012	6800	165	0	1634	348
6/30/2012	3812	5784	8195	199	0
7/1/2012	1181	6919	2267	1352	0
7/2/2012	N/A	N/A	N/A	N/A	N/A
7/3/2012	N/A	N/A	N/A	N/A	N/A
7/4/2012	4710	3342	12990	7096	0
7/5/2012	0	298	715	728	0
TOTALS	27206	17232	43347	17610	4830

From Air Quality Division Fire EE demonstration for June-July 2012 PM_{2.5} exceedance at multiple monitors.

Monitor Distance from Facility Operations

The following table indicates that the closest active mining pit to the site that measured a monitored exceedance is located at a different facility.

Table 2: Distance from Active Mine Pits to Site 851

Pit	Distance
HCMA	20,462 ft
WAN	28,107 ft
WANB	27,971ft
CMA	10,041 ft
NARM	7,669 ft

From Antelope Coal, LLC Fire EE demonstration for 9/15/2012 PM₁₀ exceedance at Antelope Mine.

Facility Operations

This table summarizes facility equipment activities during an exceedance, providing a field of reference for what was occurring at the facility during the event. The numbers in the second column are internal identification numbers for specific equipment.

Table 3 Equipment Working in 2UD Pit 5 on 6/13/2013 between 6:00 p.m. and Midnight		
Shovel	35	Dug on west side of pit
Truck	60	16 loads - dumped in pit
	62	16 loads - dumped in pit
	65	15 loads - dumped in pit
	66	17 loads - dumped in pit
Dozers	130	Worked in pit - overburden
	132	Worked in reclamation - Skull Point Area
	133	Worked dump
	221	Worked in pit with shovel
Water trucks	20	Made an initial pass between 6:20 and 6:50 p.m. covering the pit and road down to Skull Point Dump 1
	19	Made 2 passes (2 loads), went down (hydraulic system) for 19 minutes in Skull Point
Motor grader	683	Worked in pit 8:30 pm until 11:00 p.m. then parked in Skull Point
	684	Down in Skull Point then swapped out for 683 at 11:00 p.m. (when released from maintenance)
Fuel truck	55	Fueled all haul trucks, water truck 19 in Skull Point Area

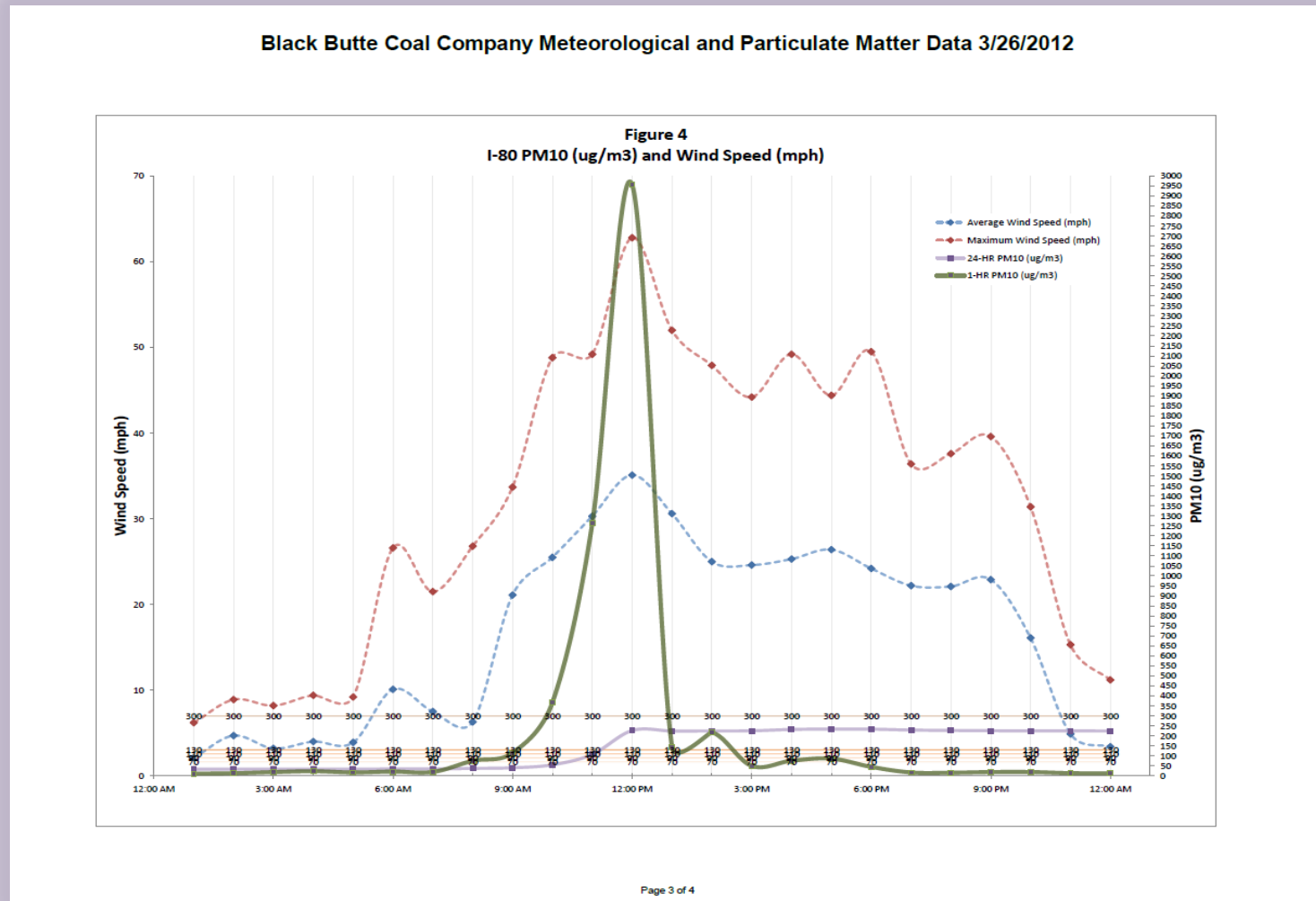
From Westmoreland Kemmerer, Inc. High Wind EE demonstration for 6/13/2013 PM₁₀ exceedance at Kemmerer Mine.

Graphs

Graphs allow data to be displayed visually, making patterns and trends easier to follow with the eye. A single parameter may be plotted to focus attention on periodic tendencies, or to highlight extreme values. Multiple factors may be graphed together to illustrate correlation, although graphs with too many elements may be confusing or counter-productive. A graph is most effective when it includes axes labels with units, a title, and a key identifying the parameters being plotted. Graphs lacking this information may be difficult for reviewers to interpret correctly.

Wind Speed vs. Pollutant Concentration

A plot comparing pollutant concentrations against wind speeds clearly demonstrates a correlation between these two parameters.

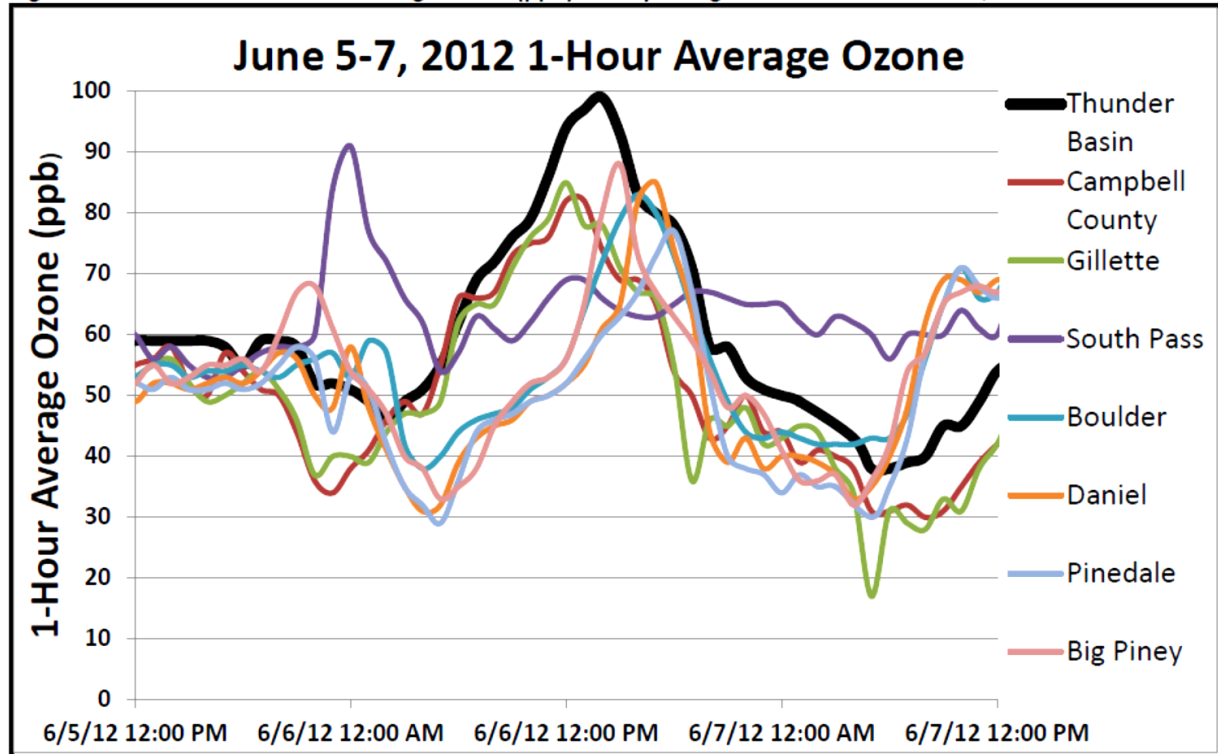


From Black Butte Coal Company High Wind EE demonstration for 3/26/2012 PM10 exceedance at Black Butte Mine.

Pollutant Concentration

Graphing pollutant concentrations at multiple locations over a given time period can help demonstrate the wide geographical influence of an event.

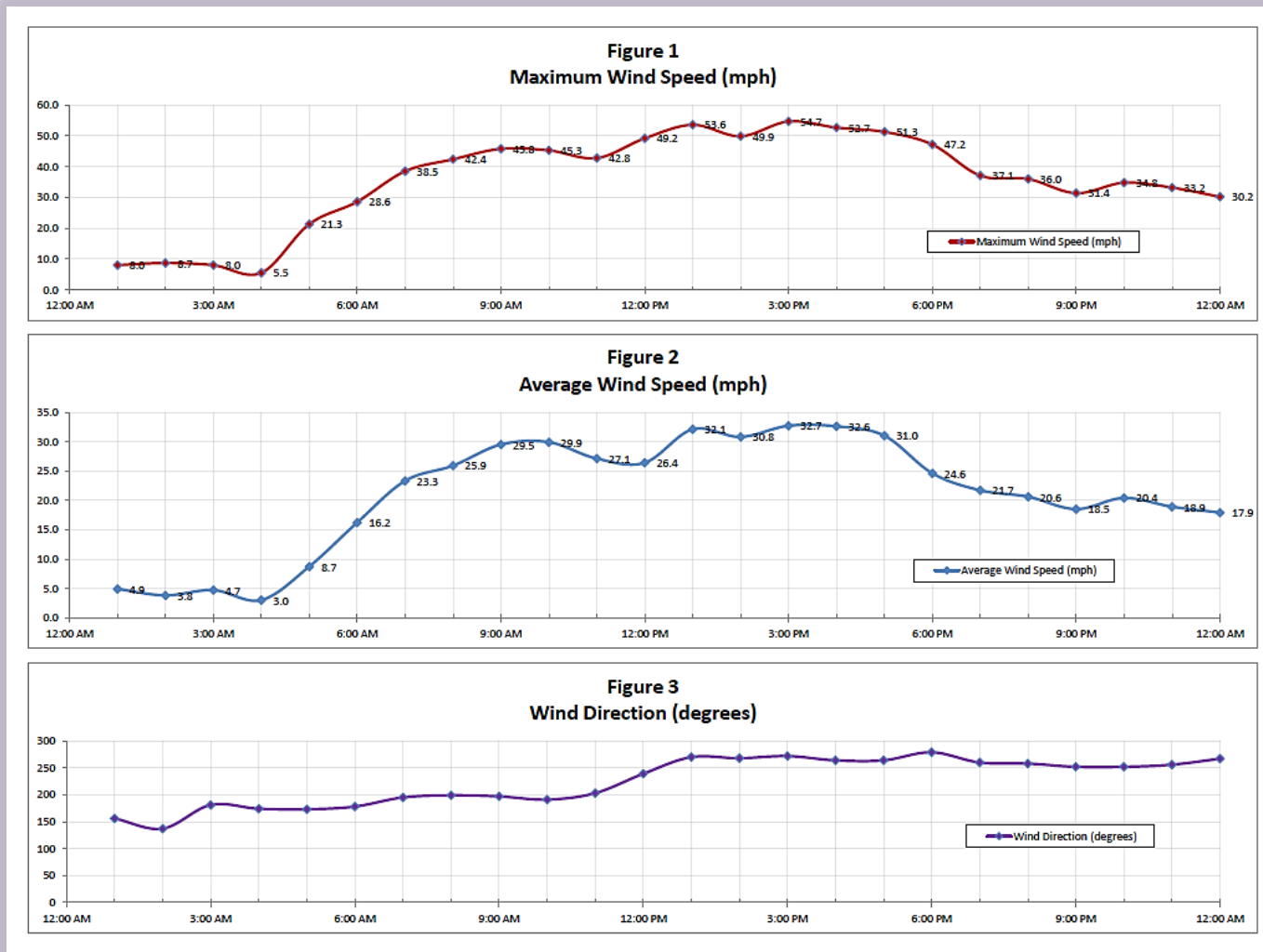
Figure 2. Time series of 1-hour average ozone (ppb) for Wyoming monitors from June 5-7, 2012.



From Air Quality Division Stratospheric Intrusion EE demonstration for 6/6/2012 Ozone exceedance at Thunder Basin.

Maximum and Average Wind Speed and Wind Direction

Stacked plots showing maximum and average wind speed and wind direction, spanning the day of the event, help illustrate the ambient conditions surrounding an exceedance.

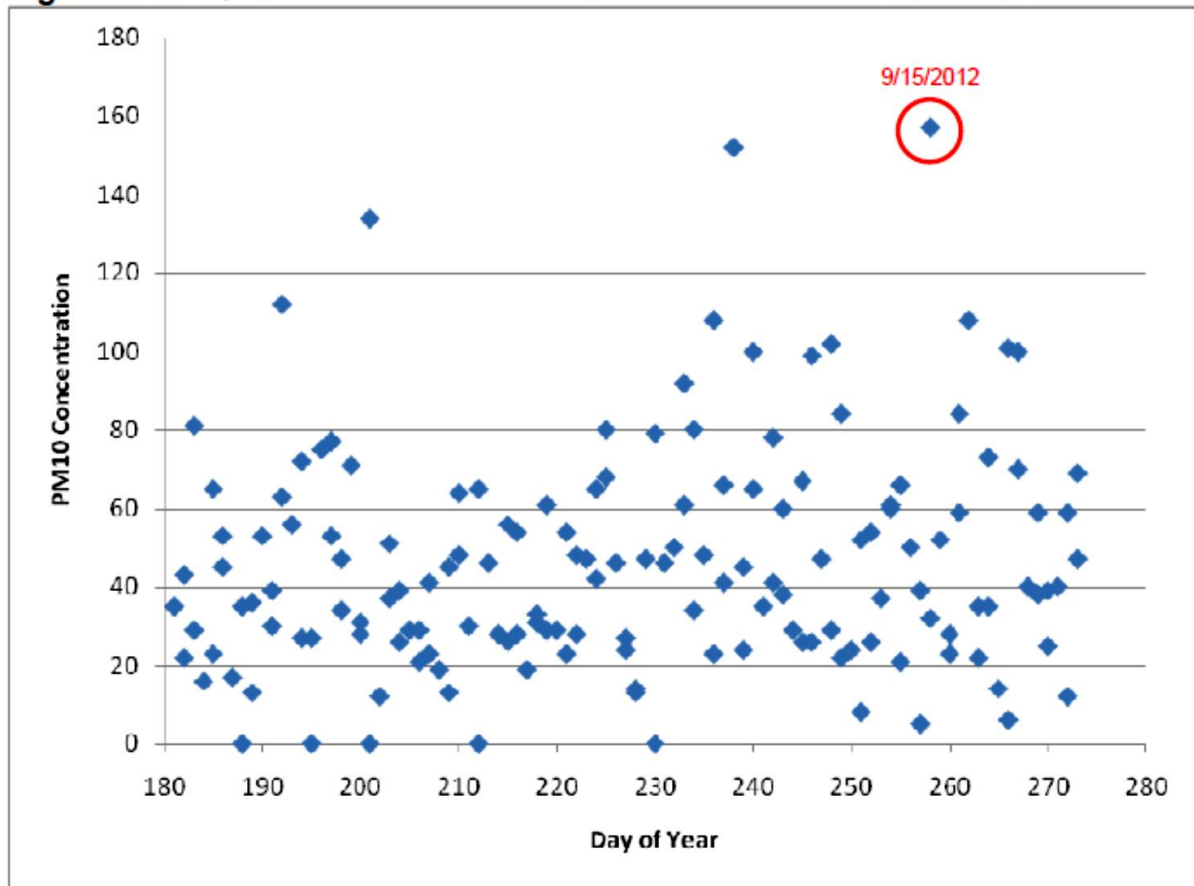


From Black Butte Coal Company High Wind EE demonstration for 2/25/2012 PM₁₀ exceedance at Black Butte Mine.

Historical Concentration Fluctuations

This graph displays the exceedance in the context of quarterly pollutant data.

Figure 7 3rd Quarter PM₁₀ Concentration ACC Mine Site 851 2007-2012

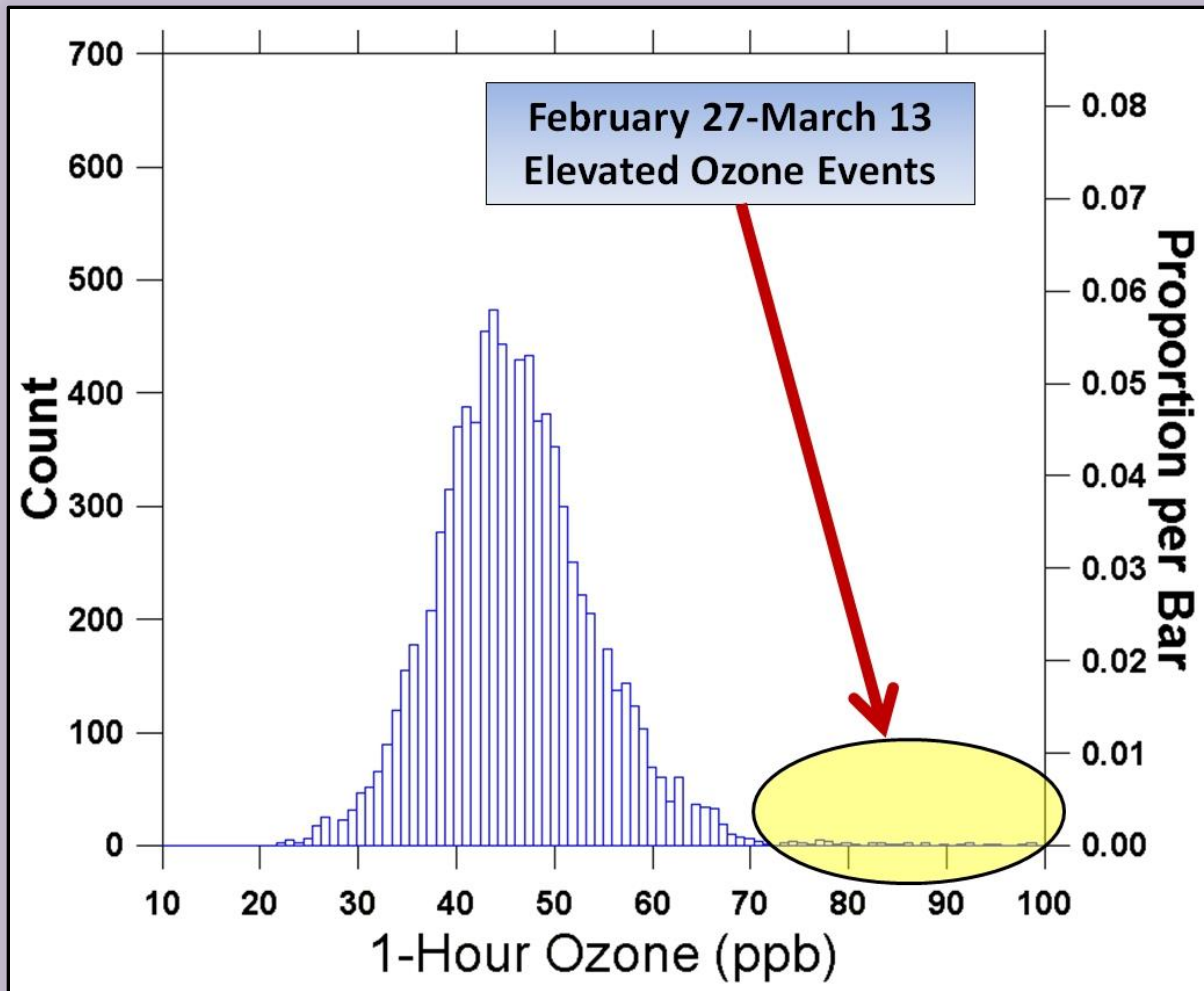


The measured PM₁₀ concentration on September 15, 2012, 157 $\mu\text{g}/\text{m}^3$ is the 99.9th percentile value for 3rd quarter data from the five years evaluated.

From Antelope Coal, LLC Fire EE demonstration for 9/15/2012 PM₁₀ exceedance at Antelope Mine.

Histogram

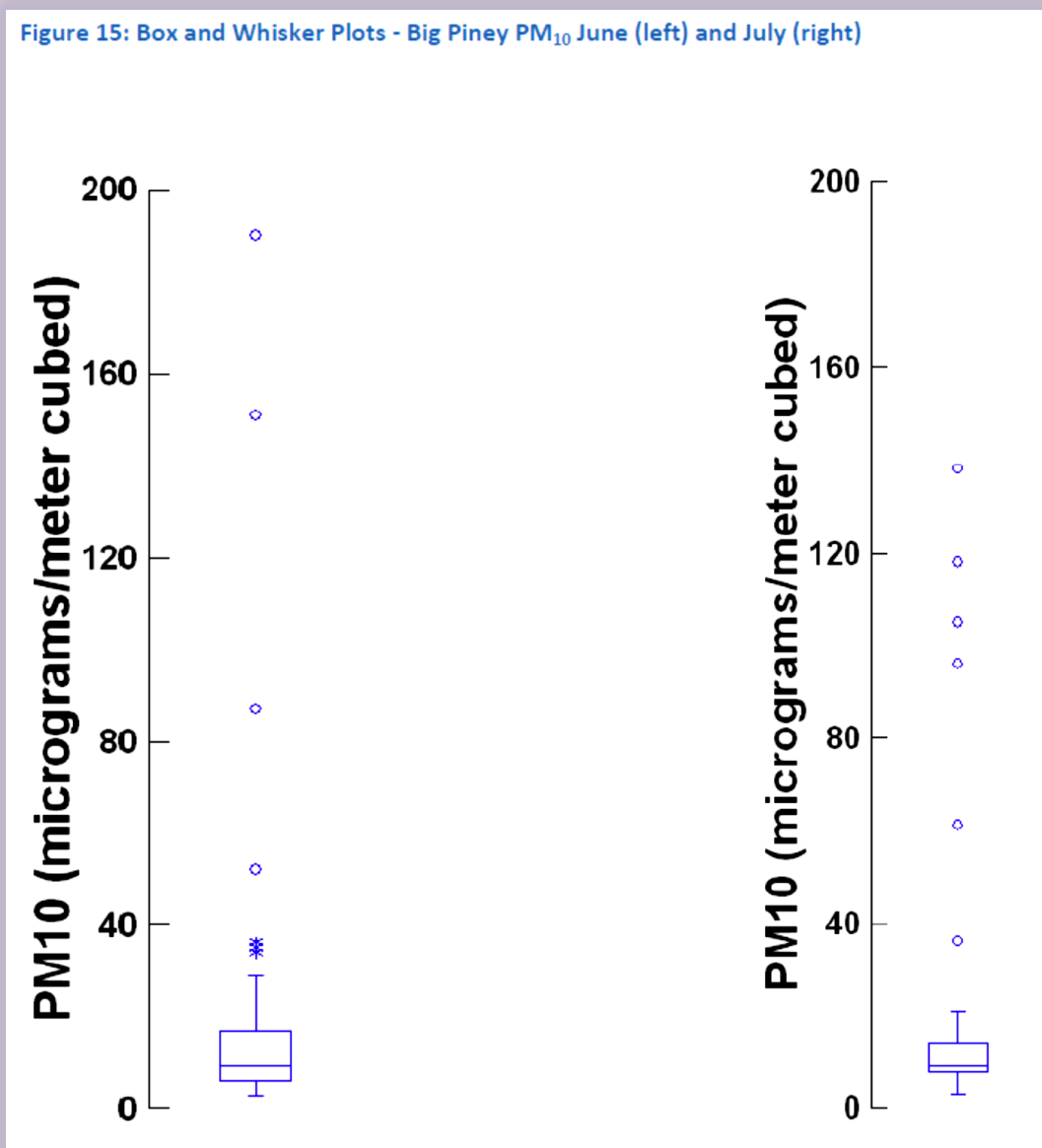
A histogram graphically displays the probability distribution of a dataset. The following bell-curved histogram shows that the most frequent Ozone concentrations occur between 40 and 50 ppb, while concentrations approaching 100 ppb, including those experienced during the events, are less and less likely.



From Air Quality Division Stratospheric Intrusion EE demonstration for February and March 2009 Ozone exceedance at South Pass.

Box and Whisker Plot

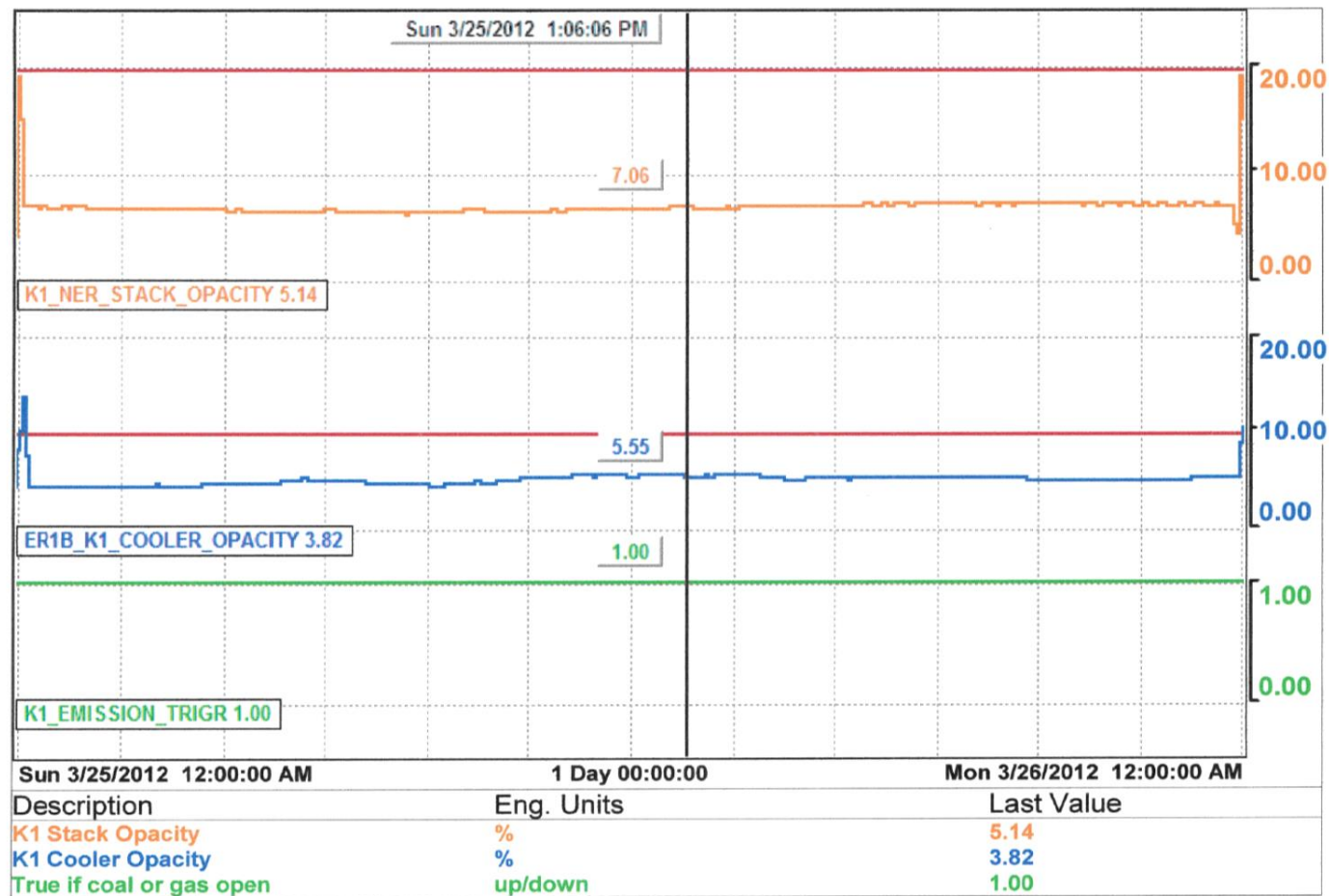
Another way to display the statistical probability of a given concentration is with a Box and Whisker Plot. The line in the middle of the box is centered on the median value of the dataset, the lower and upper reaches of the box itself represent the 25th and 75th percentile respectively, the “whiskers” indicate values that are 1.5 times the interquartile range (IQR, equal to the width of the box), asterisks represent outlier values between 1.5 and 3 times the IQR, and circles represent outlier values greater than 3 times the IQR. The example below clearly shows that the exceedance recorded in June, represented by the uppermost dot, is an extreme outlier in the dataset.



From Air Quality Division Fire EE demonstration for June 26-July 5, 2012 PM_{2.5} and PM₁₀ exceedance at multiple sites.

Opacity

A chart displaying Continuous Emissions Monitoring Systems (CEMS) data (in blue and orange) showing no major elevated emissions during the time of the exceedance (marked by the central, vertical black line).



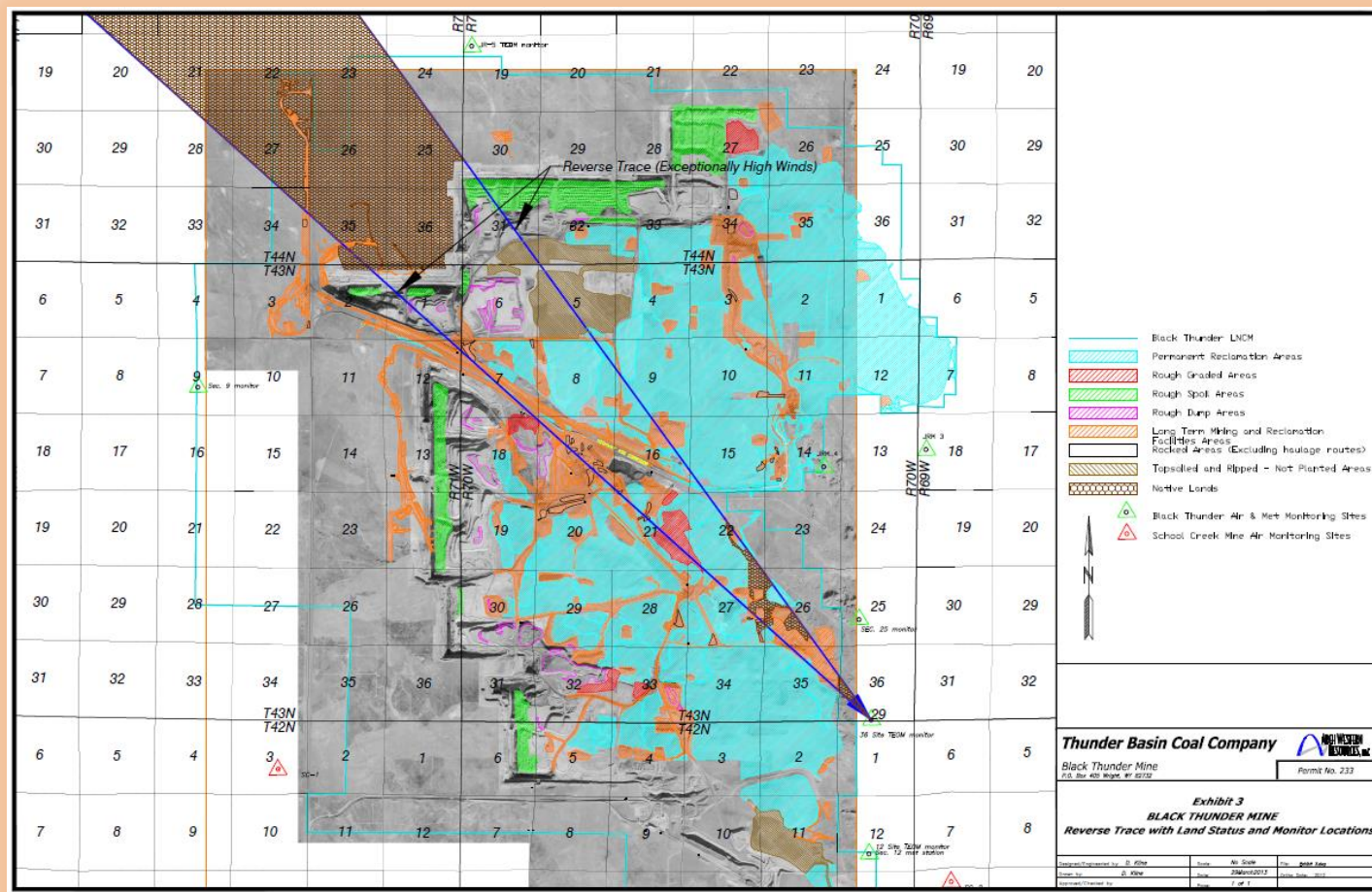
From Mountain Cement Company High Wind EE demonstration for 3/26/2012 PM₁₀ exceedance at Mountain Cement.

Images

Images provide powerful qualitative information that can be utilized to support quantitative data. Conceptual illustrations help to explain difficult theories, and maps give geographical context to data. Due to the logistics of posting final demonstrations for public comment, page size of maps should be no larger than 11" x 17". Providing electronic copies of photos along with demonstration documents allows reviewers to verify important embedded metadata including the time and date the photos were taken.

Facility Map

A facility map is a useful tool in familiarizing demonstration readers to a facility's geographic extent, monitoring network configuration, and surrounding features. Maps can also help contribute to the weight of evidence in a demonstration such as the example below, which overlays a back-trajectory based on predominate wind data on a map showing land use and cover patterns in and around the facility. Maps should include labeled features, points of interest, scale indicator, north arrow, key, and other information which may help orient the reviewer.



From Thunder Basin Coal Company, LLC High Wind EE demonstration for 3/4/2013 PM₁₀ exceedance at Black Thunder Mine.

Photographs

Pictures taken during an event can help demonstrate facility compliance actions taken, as shown in the first image, or can document the event itself, as in the second. Date stamps are useful in verifying that a photograph was taken at the time of the event.



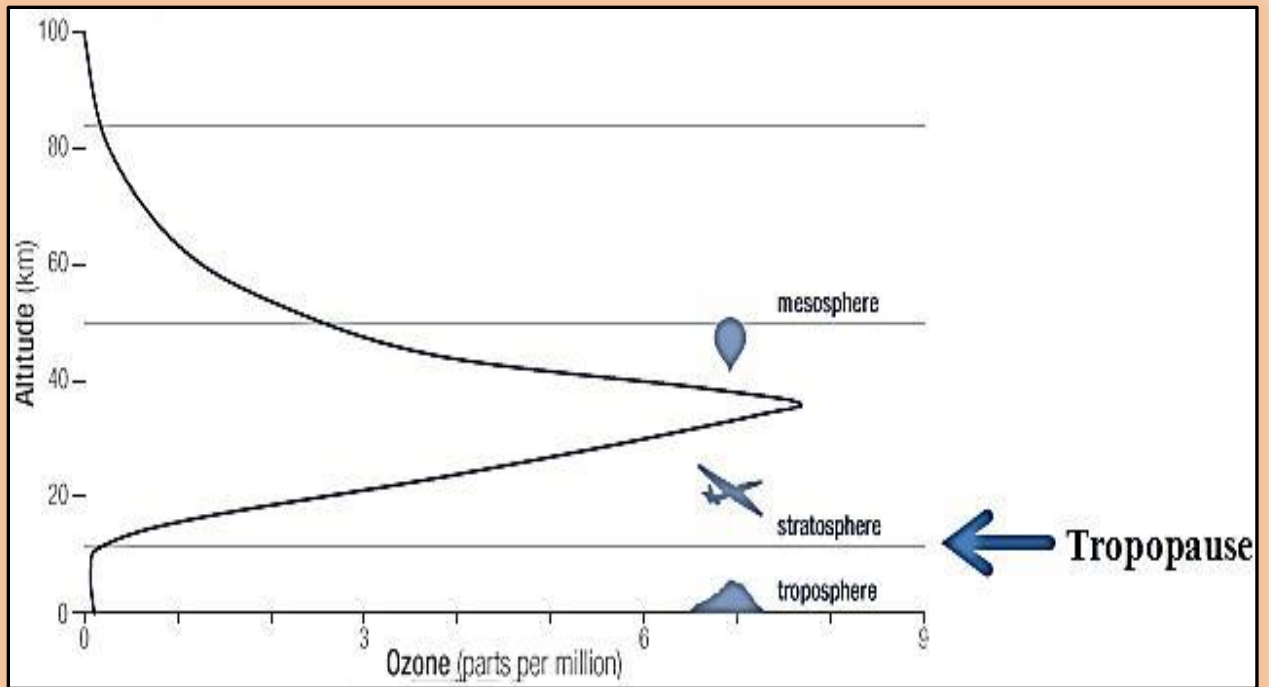
From PacifiCorp High Wind EE demonstration for 1/13/2012 PM₁₀ exceedance at Naughton Power Plant.



From Air Quality Division Fire EE demonstration for June 26-July 5, 2012 PM₁₀ and PM_{2.5} exceedances at multiple sites.

Conceptual Illustrations

Conceptual graphics help the reader understand complex concepts and ideas. The following graphic illustrates the expected ozone concentration at different levels in the atmosphere to reinforce the idea that there is a great deal more ozone in the stratosphere than the troposphere, which causes high ozone concentrations during stratospheric intrusions.

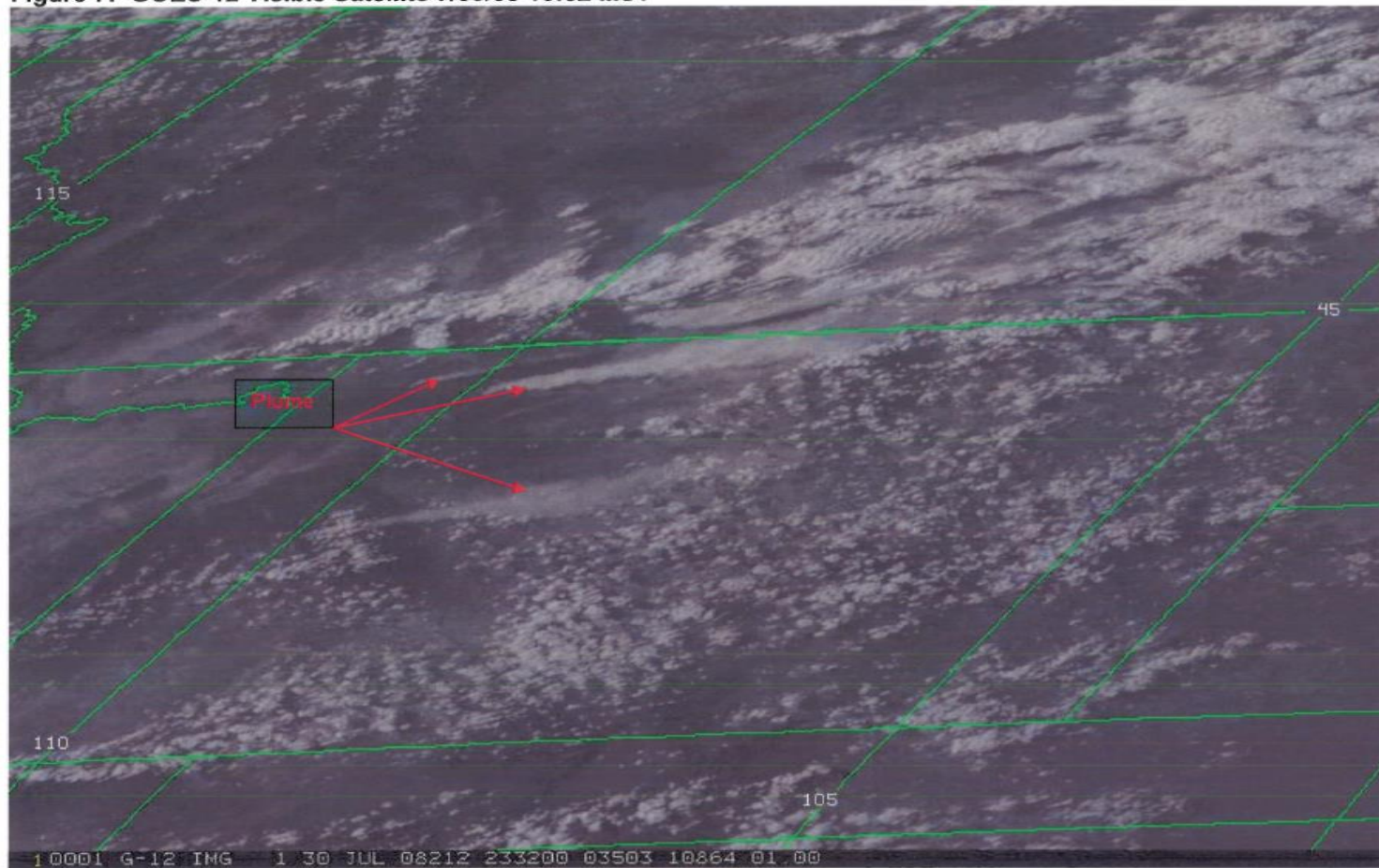


From Air Quality Division Stratospheric Intrusion EE demonstration for February and March 2009 Ozone exceedances at South Pass.

Satellite Images

Satellite images can help establish the larger geographic context of a facility, or can be used to display real-time visual observations of an event as in the image below, which shows smoke plumes from fires being blown in the direction of monitors. Imagery from the GOES Infrared Weather Satellite and other fire and smoke products can be found on NOAA's Hazard Mapping System website: <http://www.ospo.noaa.gov/Products/land/hms.html>.

Figure 7: GOES-12 Visible Satellite 7/30/08 18:32 MST

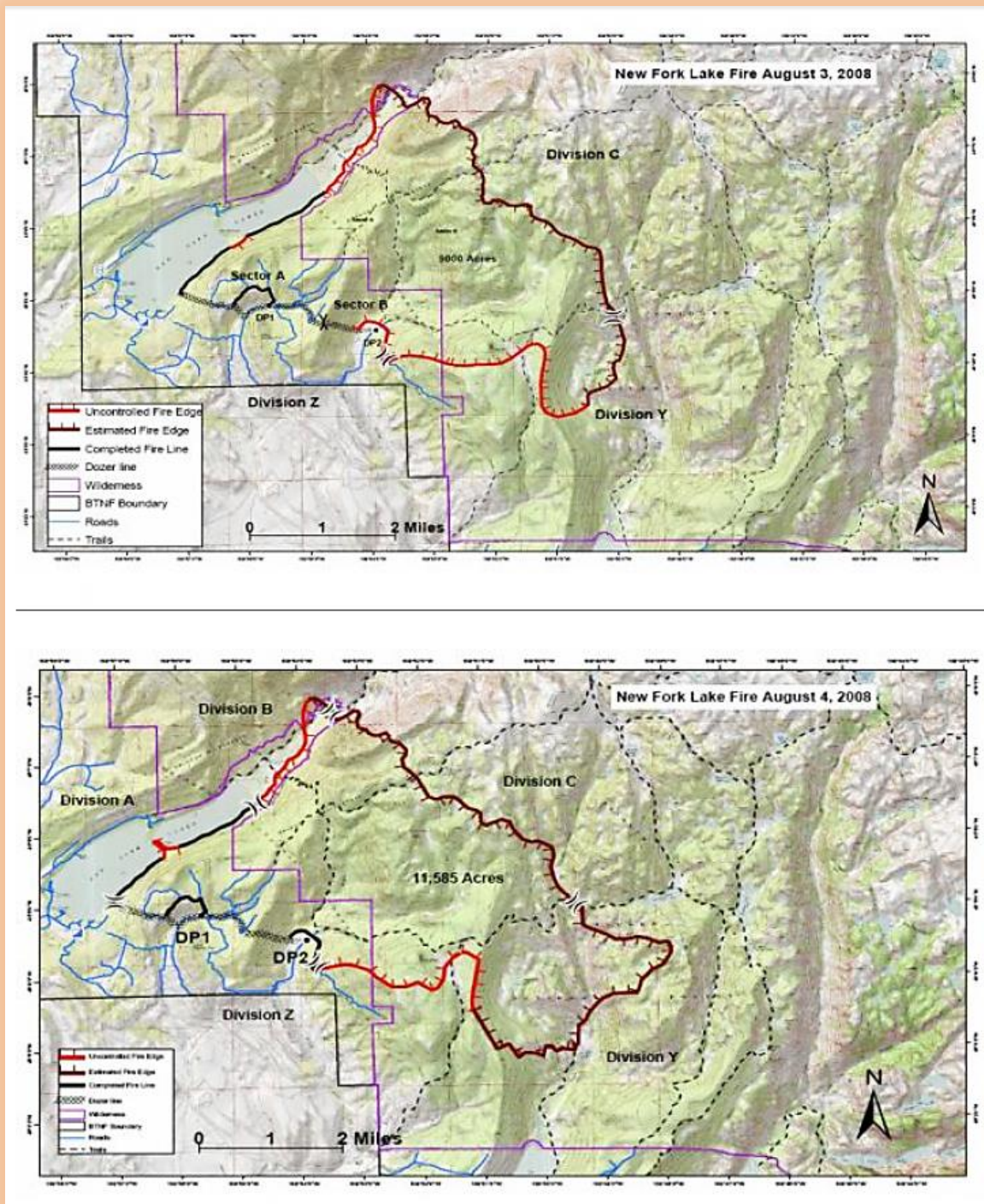


From Triton Coal Company, LLC Fire EE demonstration for 7/30/2008 PM₁₀ exceedance at North Rochelle and Black Thunder Mines.

Fire Progression Map

Fire progression maps show the known extent of controlled and uncontrolled sections of wildfires. Maps from adjacent days may be used to show the growth or subsidence of a fire, with growth indicating an increase in emissions. A good place to find fire progression maps for major active fires is the National Interagency Fire Center Incident Information System:

<http://inciweb.nwcg.gov/>.



From Air Quality Division Fire EE demonstration for 8/4/2008 PM_{2.5} exceedance at Pinedale.

Video

A video, like a photograph, may capture real-time qualitative data of an event, such as this video looking into the North end of Pit 11 at the Black Butte Mine.



From Black Butte Coal Company High Wind EE demonstration for 1/8/2013 PM₁₀ exceedance at Black Butte Mine.

Outside Sources

News accounts and other outside sources, such as weather forecasts and summaries, may provide valuable, unbiased information about an event. The correlation between collected data and reported information can further serve to validate data presented elsewhere in a demonstration.

Hazardous Weather Warning

The National Weather Service (NWS) dispatches hazardous weather predictions and alerts for a number of potential and active conditions, including high winds and storms. Active NWS Alerts can be found at <http://alerts.weather.gov/>.

High Wind Warning

URGENT - WEATHER MESSAGE
NATIONAL WEATHER SERVICE RAPID CITY SD
427 AM MDT TUE MAR 27 2007

.STRONG LOW PRESSURE MOVING INTO THE AREA FROM THE WEST WILL
CREATE VERY GUSTY SOUTHEAST WINDS OVER NORTHEASTERN
WYOMING...NORTHWESTERN
SOUTH DAKOTA...AND PORTIONS OF WEST CENTRAL SOUTH DAKOTA TODAY.

WYZ054>058-271830-
/O.CON.KUNR.HW.W.0008.000000T0000Z-070328T0000Z/
NORTHERN CAMPBELL-SOUTHERN CAMPBELL-WESTERN CROOK-
WYOMING BLACK HILLS-WESTON-
INCLUDING THE CITIES OF...GILLETTE...WRIGHT...MOORCROFT...
HULETT...SUNDANCE...FOUR CORNERS...NEWCASTLE
427 AM MDT TUE MAR 27 2007

...HIGH WIND WARNING REMAINS IN EFFECT UNTIL 6 PM MDT THIS
AFTERNOON...

A HIGH WIND WARNING REMAINS IN EFFECT UNTIL 6 PM MDT THIS
AFTERNOON.

SOUTHEAST WINDS WILL INCREASE OVER NORTHEASTERN WYOMING THIS
MORNING TO
35 TO 45 MPH WITH GUSTS TO 60 MPH POSSIBLE. THE WINDS WILL BEGIN
TO DIMINISH THIS EVENING.

A HIGH WIND WARNING MEANS 40 MPH WINDS...OR GUSTS OVER 60 MPH...
ARE EXPECTED OR OCCURRING.

From Powder River Coal, LLC High Wind NEAP demonstration for 3/27/2007 PM10 exceedance at Rawhide Mine.

Blowing Dust Health Alert

Similar to Hazardous Weather Warnings, the NWS sends out Air Pollution Alerts and Advisories in response to possible hazardous ambient conditions, in particular Blowing Dust Health Alerts such as the example below.

AIR QUALITY ALERT MESSAGE
NATIONAL WEATHER SERVICE RAPID CITY SD
937 AM MDT THU APR 12 2012

...[BLOWING](#) DUST HEALTH ALERT IN EFFECT FOR THE ENTIRE POWDER RIVER
[BASIN](#) OF NORTHEASTERN WYOMING THROUGH 300 PM MDT THIS AFTERNOON...

SOUTH TO SOUTHWEST WINDS OF 30 TO 45 MPH WITH GUSTS UP TO 60 MPH
WILL CONTINUE THROUGH THIS AFTERNOON. THE WINDS WILL BEGIN TO
DIMINISH BY LATE THIS AFTERNOON AND THIS EVENING.

THE WYOMING AIR QUALITY DIVISION RECOMMENDS THE ELDERLY...YOUNG
CHILDREN...AND INDIVIDUALS WITH RESPIRATORY PROBLEMS AVOID EXCESSIVE
PHYSICAL EXERTION AND MINIMIZE OUTDOOR ACTIVITIES DURING THIS TIME.
ALTHOUGH THESE PEOPLE ARE MOST SUSCEPTIBLE TO HEALTH IMPACTS...THE
AIR QUALITY DIVISION ALSO ADVISES THAT EVERYONE SHOULD AVOID
PROLONGED EXPOSURE TO THE POOR AIR QUALITY CONDITIONS.

From Buckskin Mining Company High Wind EE demonstration for 4/12/2012 PM10 exceedance at Buckskin Mine.

Weather Summary or Forecast

The NWS, The Weather Channel, Weather Underground, and many other sources provide a number of weather forecast and summary products, often customizable to user needs. The following is a weather summary from the NWS' Western and Central Wyoming Weather Forecast Office: <http://www.crh.noaa.gov/riw/>.

**National Weather Service Weather Forecast Office
Western and Central Wyoming**

A Windy St. Patty's Day

The National Weather Service
Building a Weather-Ready Nation

[Summary](#) | [Forecast](#) | [Monitoring & Reporting](#)

Summary

St. Patrick promised a windy St. Patty's Day, and he delivered! A quick moving system brought through a sharp cold front with some snow, and a lot of wind. There were reports of trees down in Fremont and Sweetwater Counties, one of which fell on a police cruiser; there were also reports of three business signs around Rock Springs being blown down, among other damage. [Click here to see the latest Public Information Statement](#) containing the full list of wind reports greater than or equal to 50 mph.

Wind Maps

[Click Image To Enlarge Low-Resolution Map](#)

The above map does not show every report, please see the latest public information statement or the table below for a more complete list

[Click Image To Enlarge Hi-Resolution Map](#)

The above map does not show every report, please see the latest public information statement or the table below for a more complete list

A Sample of Peak Wind Gusts Around Central and Western Wyoming

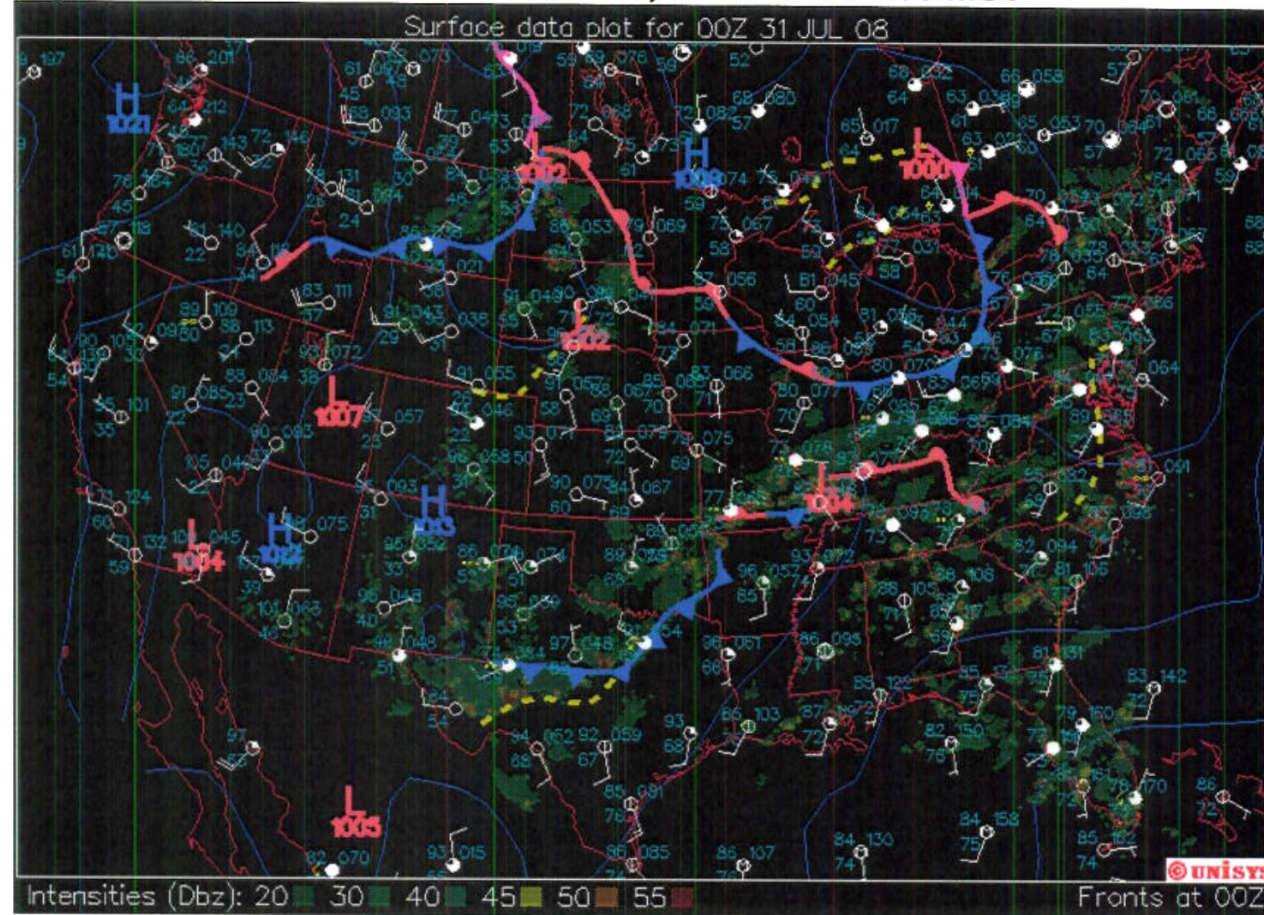
County	Station Name	Wind Gust (mph)
Teton	Jackson Hole-Summit	77
MONTANA	Soda Butte	75
Fremont	7 NW Lander	73
Fremont	Red Canyon	73
Sweetwater	Bitter Creek	71
Sweetwater	Rock Springs ASOS	69
Natrona	Fales Rock	69
Fremont	Lander ASOS	68
Sweetwater	Reliance	66
Sweetwater	Baxter	66
Fremont	South Pass City	66

From Black Butte Coal Company High Wind EE demonstration for 3/17/2013 PM10 exceedance at Black Butte Mine.

National Oceanic and Atmospheric Administration (NOAA) Surface Weather Data Plot

Surface Weather Data Plots show major pressure systems, wind speed, wind direction, and temperature. Current and recent maps can be viewed on NOAA's Weather Prediction Center website: <http://www.hpc.ncep.noaa.gov/html/sfc2.shtml>.

Figure 7: Surface Weather Data Plot, 7/30/2008 17:00 MST



From Thunder Basin Coal Company Fire EE demonstration for 7/30/2008 PM₁₀ exceedances at North Rochelle and Black Thunder Mines.

NOAA Smoke Plume Detection

Smoke Plume Detection maps display regional impacts from fire smoke plumes detected by meteorological satellites. Smoke Plume Detection Maps and other fire and smoke products can be found on NOAA's Hazard Mapping System website:
<http://www.ospo.noaa.gov/Products/land/hms.html>.

Figure 9: NOAA Smoke Plume Detection 7/30/08



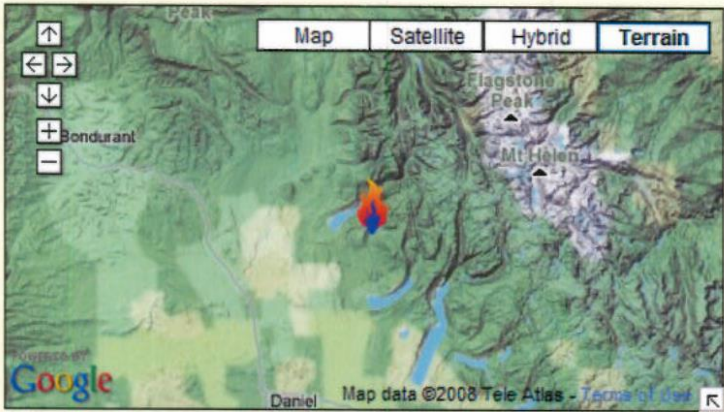
<http://satapsanone.nesdis.noaa.gov/FIRE/fire.html>

From Thunder Basin Coal Company Fire EE demonstration for 7/30/2008 PM₁₀ exceedances at North Rochelle and Black Thunder Mines.

National Interagency Fire Center Incident Report

The National Interagency Fire Center is a national support center for wildland firefighting. Its online InciWeb portal provides detailed information about current active and inactive wildfires: <http://inciweb.nwcg.gov/>.

**Figure 3: Incident Report from National Interagency Fire Center
(<http://www.inciweb.org/incident/1440/>)**

Location		Summary	Image
Approximate Location 43.106 latitude, -109.91 longitude			
			
Basic Information			
Incident Type	Wildland Fire		
Cause	Human		
Date of Origin	Tuesday July 29th, 2008 aprox 01:00 PM		
Location	19 miles north of Pinedale, WY		
Incident Commander	Flinders		
Current Situation			
Total Personnel	56		
Size	11,960 acres		
Percent Contained	65%		
Estimated Containment Date	Monday December 01st, 2008 aprox 12:00 AM		
Fuels Involved	Decadent timber stands and bug kill lodgepole pine.		
Fire Behavior	Creeping and smoldering fire		
Significant Events	The fire is being monitored as it burns in the Wilderness area.		

From Thunder Basin Coal Company Fire EE demonstration for 7/30/2008 PM10 exceedances at North Rochelle and Black Thunder Mines.

News Article

Providing local news accounts of an event adds weight to a facility's claim by independently presenting the event as locally significant.

Monday, January 10, 2007

Community

The Platte County

Freezy days



High winds snapped the top off of a tree in Wheatland last Wednesday evening. West Winds Tree Service contractor Dave Smith said that about half of the tree was taken off, and a nearby tree was damaged by the impact.

Wind also contributed to a tree falling and crushing a fence west of Wheatland.

The National Weather Service reported wind gusts of 58-86 mph Jan. 3rd from 1:30 p.m. on into the night, and a 101 m.p.h. gust on Saturday around 11:30 a.m. -1/06/07 At least 5 rollovers in Platte County over the weekend were possibly wind related according to Steve Townsend from Highway Patrol.

Photos/Amanda Fry



6 census shows more students should be going to school

From Basin Electric Power Cooperative High Wind EE demonstration for 1/6/2007 PM10 exceedance at Laramie River Station.

The Source

Monday, August 13, 2007

WYOMING EDITION

Fires scorch Yellowstone, Montana areas

By MIKE STARK
Of The Gazette Staff

A large fire near Sylvan Pass forced the closure of the East Entrance to Yellowstone National Park on Sunday.

The Columbine fire, fanned by fierce winds, grew by 9,000 acres in a matter of hours Sunday afternoon, prompting park officials to clear out the road from the East Entrance to Pelican

Creek, which is near Fishing Bridge, and then close the east gate, about 50 miles west of Cody.

The fire burned within a half-mile of the East Entrance road about three miles west of the gate.

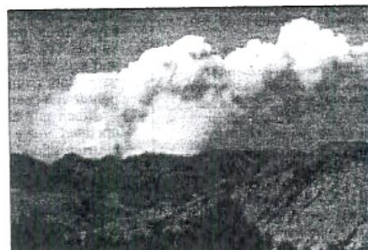
"The East Entrance road will remain closed overnight," Al Nash, a Yellowstone spokesman, said Sunday night. "We will reassess in the morning

based on fire behavior."

Earlier Sunday, fire officials estimated the Columbine fire had burned about 3,000 acres. By the afternoon, the fire had grown to about 12,000 acres. Park officials closed the East Entrance at 4:15 p.m.

Gusty winds and dry conditions allowed the fire near Sylvan Pass to blow up fast.

Please see Fires, 8A



The Wicked Creek fire makes a big run Sunday afternoon as seen from an overlook above Mammoth Terraces in Yellowstone National Park.

BOB ZELLAR/
Gazette Staff

From Air Quality Division Fire EE demonstration for August 13 and 16, 2007 PM2.5 exceedances at Sheridan.

Studies and Modeling

Studies offer an in-depth look at specific data, providing scientific backing to a claim. Facilities are encouraged to gain AQD approval of design prior to conducting a study to ensure that appropriate scientific procedures and protocols are followed, which in turn will produce valid results. Models provide flexibility by allowing a range of real or theoretical data to be input, and can be used to predict future outcomes or to replicate known results. It is inappropriate to subtract theoretical (modelled) data from monitored data. Rather, modelling should be used to suggest trends and independently support monitored data. For guidelines on correct usage and regulatory application of Air Quality Models, reference 40 CFR Part 51, Appendix W.

Particle Characterization Analysis

Laboratories conduct particle characterization analyses to determine the content of collected particulate matter. The relative proportion of different species of particulate helps to identify the possible source(s) of dust contributing to a measured exceedance.



RJ LeeGroup, Inc.
350 Hochberg Road, Monroeville, PA 15146
Tel: (724) 325-1776 | Fax: (724) 733-1799

August 6, 2007

Mr. Kevin Chartier
Inter-Mountain Laboratories, Inc.
555 Absaraka
Sheridan, WY 82801

RE: Results from Particle Characterization Analysis
RJ Lee Group Project Number TEH707121

Dear Mr. Chartier:

Following are the results of the particle characterization analysis performed on the "PM10 sample on quartz fiber filter" which was received on July 19, 2007 (reference Request for Analytical Services dated July 18, 2007). The sample was identified by Inter-Mountain Labs as sample number 133851 and assigned RJ Lee Group sample number 631055.

The purpose of this investigation was to size and characterize the particle matter associated with the sample. Manual scanning electron microscopy (MSEM) and computer controlled scanning electron microscopy (CCSEM) coupled with energy dispersive spectroscopy (EDS) techniques were used to distinguish among different particle types based on morphology and elemental composition.

Optical Review

Initially an optical microscopy review was performed to assess the as-received sample material. The majority of the particulate observed on the filter were black or brown in color. (Figure 1).

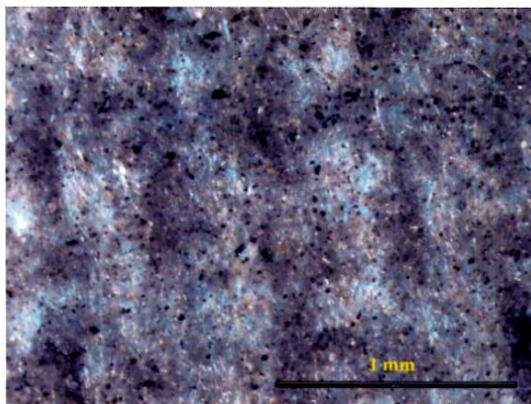


Figure 1. Optical photo of as-received sample particle loading.

www.rjlg.com

Soil Study

Below is a soil study showing soil acidity and total organic vapor (TOV) content in support of a demonstration claiming the influence of SO₂ from the active remediation of upwind acidic soils.

TABLE 4-3
FIELD-SCALE NEUTRALIZATION TEST CELL SOIL RESULTS
SWMU 6B - RESIDUUM STORAGE AREA (RSA)
SINCLAIR WYOMING REFINING COMPANY, SINCLAIR, WYOMING

NEUTRALIZATION TEST CELL #1 (NTC-1)

Pre-Neutralization

Depth ¹ feet	pH (NW/NE/S)	TOV (in ppm) (NW/NE/S)	pH Average	TOV Average
4	1.79/2.05/1.79	181/166/172	1.88	173
8	1.60/1.91/1.44	44/73/20.2	1.65	45.7
11	0.63/1.84/0.50	11.1/17.7/14.3	0.99	14.4

Average through depth intervals: 1.51 77.7

Post-Neutralization

Depth ¹ feet	pH (NW/NE/S)	TOV (in ppm) (NW/NE/S)	pH Average	TOV Average
4	6.09/5.62/6.11	86.7/93.0/107.4	5.94	95.7
8	5.82/5.78/6.37	83.5/83.6/88.0	5.99	85.0
11	6.35/6.00/6.30	79.9/81.0/58.2	6.22	73.0

Average through depth intervals: 6.05 84.6

NEUTRALIZATION TEST CELL #2 (NTC-2)

Pre-Neutralization

Depth ¹ feet	pH (NW/NE/S)	TOV (in ppm) (NW/NE/S)	pH Average	TOV Average
2	2.46/3.40/2.61	5.2/7.7/13.5	2.82	9
4	2.86/4.28/1.44	31.3/81.0/39.9	2.86	50.7
6	1.09/3.92/1.27	10.3/4.0/87.2	2.09	33.8

Average through depth intervals: 2.59 31.1

Post-Neutralization

Depth ¹ feet	pH (NW/NE/S)	TOV (in ppm) (NW/NE/S)	pH Average	TOV Average
2	7.44/7.30/7.07	49.9/65.9/81.4	7.27	65.7
4	7.16/7.16/7.04	72.1/51.6/59.5	7.12	61.1
6	7.10/7.17/7.17	42.8/45.0/36.6	7.15	41.5

Average through depth intervals: 7.18 56.1

NEUTRALIZATION TEST CELL #3 (NTC-3)

Pre-Neutralization

Depth ¹ feet	pH (NW/NE/S)	TOV (in ppm) (NW/NE/S)	pH Average	TOV Average
2	1.67/3.92/3.65	60.7/27.9/27.0	3.08	39
4	1.03/1.58/1.53	18.4/62.6/70.0	1.38	50.3
6	1.29/1.42/1.40	26.5/32.1/17.3	1.37	25.3

Average through depth intervals: 1.94 38.0

Post-Neutralization

Depth ¹ feet	pH (NW/NE/S)	TOV (in ppm) (NW/NE/S)	pH Average	TOV Average
2	7.08/6.50/6.49	20.1/15.1/27.7	6.69	21.0
4	6.51/7.02/6.68	34.6/30.1/56.8	6.74	40.5
6	6.89/7.28/7.12	43.8/51.6/43.1	7.10	46.2

Average through depth intervals: 6.84 35.9

Notes:

Minimal temperature change was observed during the neutralization process.

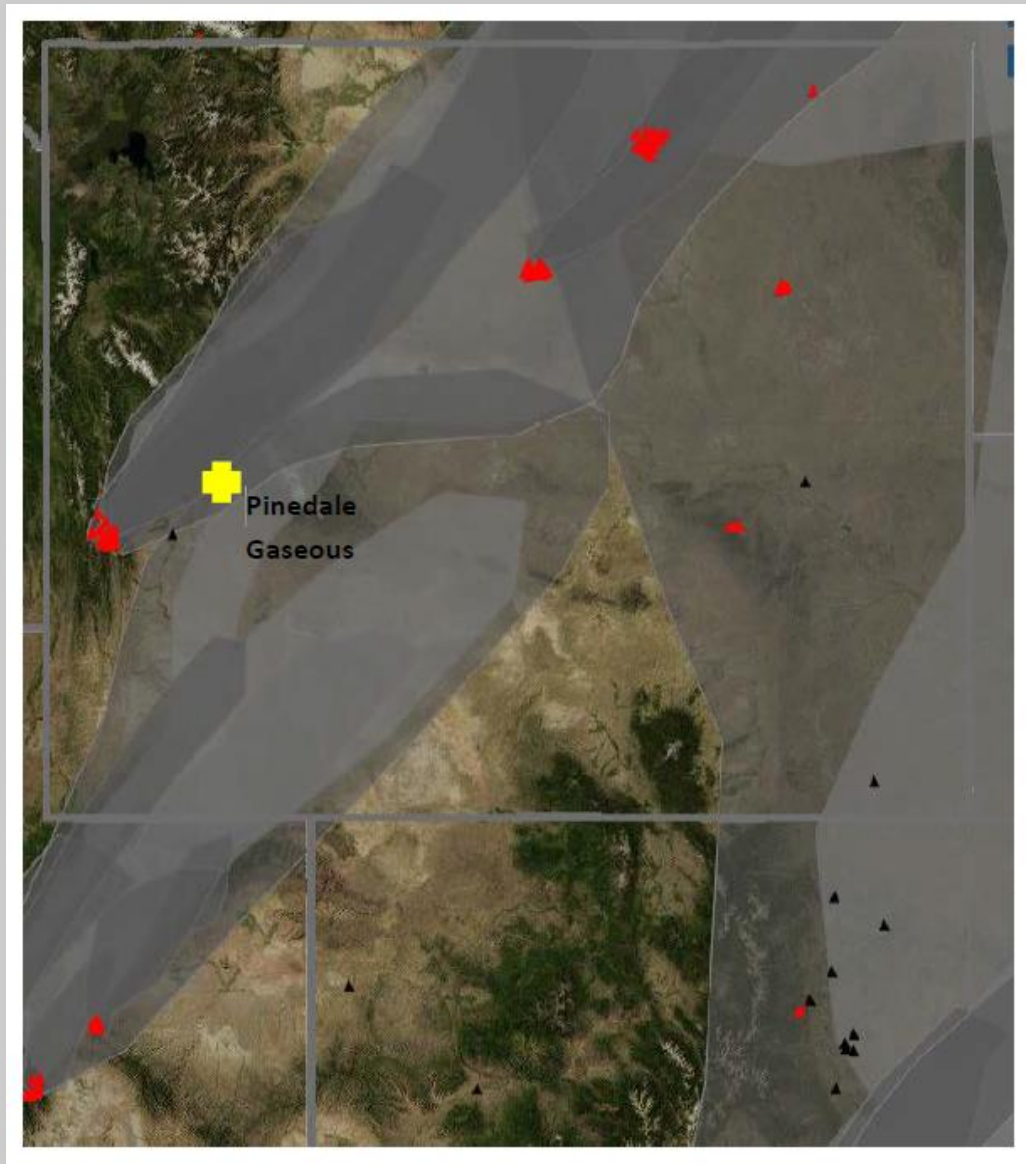
¹ Samples collected from northwest, northeast, and south sections of cell in each depth interval.

TOV = total organic vapor

ppm = parts per million

NOAA's Hazard Mapping System (HMS) Fire and Smoke Product

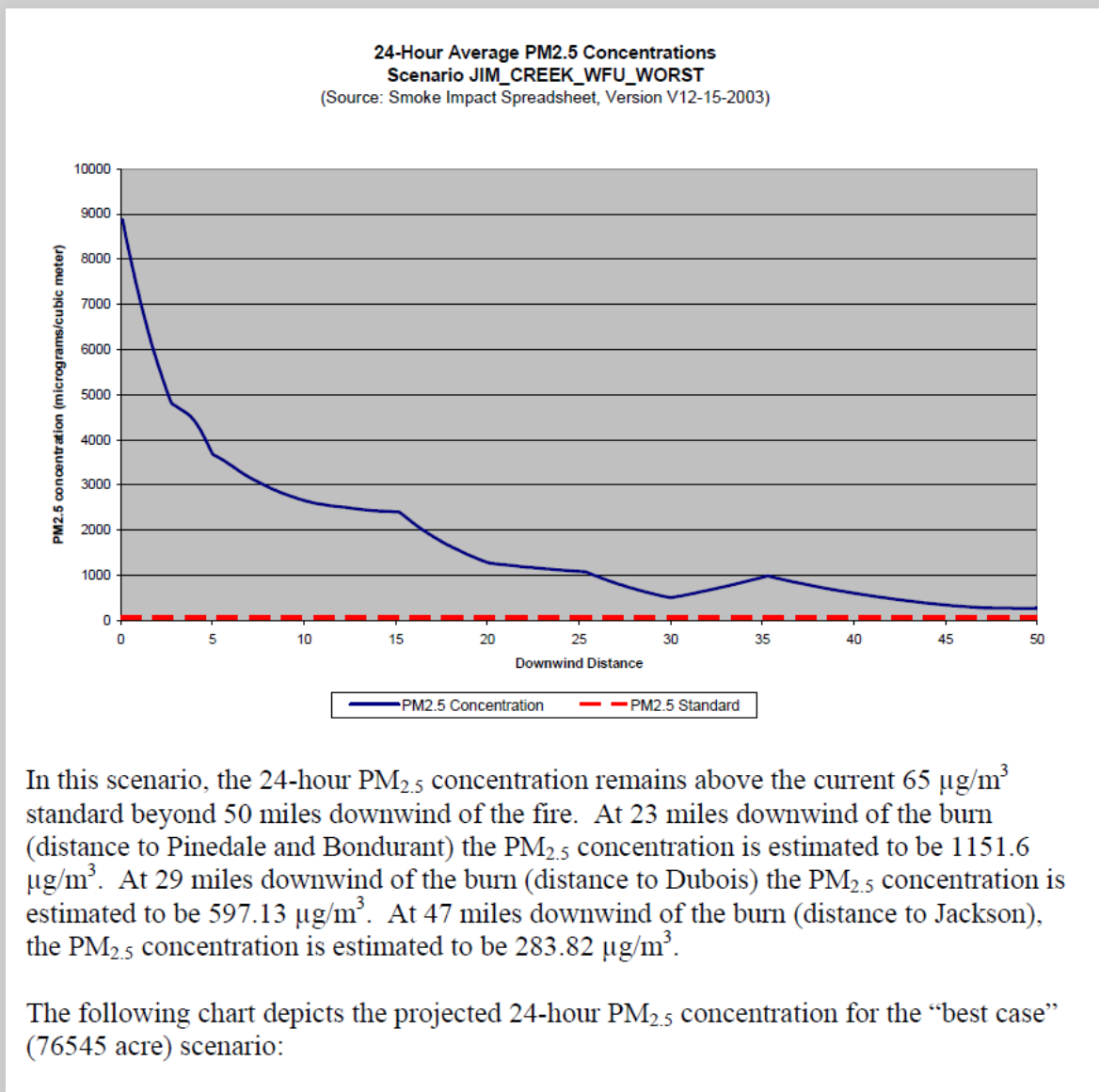
HMS' downloadable KML files combine meteorological and fire data provided by NOAA to produce significant smoke plume overlays in Google Earth. In the example below, red triangles represent known fires and the yellow cross indicates an exceeding monitor. Current and archived fire and smoke files and other fire and smoke products can be found on NOAA's Hazard Mapping System website: <http://www.ospo.noaa.gov/Products/land/hms.html>.



From Air Quality Division Fire EE demonstration for June 26-July 5, 2012 PM_{2.5} and PM₁₀ exceedances at multiple sites.

SIS/CALPUFF

The SIS model is used to estimate wildfire emissions during the flaming and smoldering phases. This information is then combined with CALPUFF atmospheric pollution dispersion modelling to estimate downwind emissions. Different data concentration “scenarios” may be tested by the model to estimate potential smoke impacts in a given area. The example below was drawn by the AQD from the United States Forest Service [Unplanned Fire Post Burn Report](#) for the Jim Creek Wildland Fire Use event.



From Air Quality Division Fire EE demonstration for 8/15/2006 PM_{2.5} exceedance at Pinedale.

Published Research

Independent published research pertaining to an event can help add weight to, and explain, concepts and claims that may be difficult to understand. The following was provided in support of the claim that the active remediation of upwind acidic and sulfuric soils was causing multiple exceedances at a facility's monitor.



Atmospheric Environment 38 (2004) 1473–1480

ATMOSPHERIC
ENVIRONMENT

www.elsevier.com/locate/atmosenv

Natural sulfur dioxide emissions from sulfuric soils

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Received 8 September 2003; received in revised form 20 November 2003; accepted 1 December 2003

Abstract

Soils have long been recognised as sulfur dioxide (SO₂) sinks, but we show that they can also be sources of atmospheric SO₂. Using static chambers and micrometeorological techniques, we have measured emissions of SO₂ from coastal lowland soils containing sulfides (mostly pyrite), commonly referred to as acid sulfate soils in Australia. SO₂ evolution seems coupled to evaporation of soil water containing sulfite. The global emissions of S from acid sulfate soils is estimated at about 3 Tg/year, which is of the same order as emissions from terrestrial biogenic sources and biomass burning and is about 3% of known anthropogenic emissions of S.

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Keywords: Sulfur dioxide; Acid sulfate soils; Gas flux; Sulfur; Sulfite

1. Introduction

Currently recognised sources for atmospheric sulfur dioxide are volcanism, biomass burning, smelting of sulfidic ores, burning of fossil fuels, and atmospheric oxidation of biogenic, volatile organic sulfur compounds, emitted from oceans, soils and vegetation (Allard et al., 1994; Bates et al., 1992; Capaldo et al., 1999; Howarth et al., 1992; Watson et al., 1992). Soils have long been recognised as SO₂ sinks (Garland, 1977), but it has been suggested that acid sulfate soils may emit SO₂ (van Breemen, 1982, 1993). Coastal lowland areas (0–10 m above mean sea level) throughout the world contain potentially 25 × 10⁶ km² of Holocene sulfidic soils deposited during and following the last sea level rise (Bush and Sullivan, 1999; White et al., 1996). When these soils are drained, sulfides oxidise and produce a

range of dissolved sulfur species in highly acidic ground water that can devastate estuarine ecosystems (Dent, 1986; Sammut et al., 1993; Wilson et al., 1999).

Acid-base budgets for acid sulfate soil profiles have shown that up to 30% of oxidised sulfur is unaccounted, prompting van Breemen (1982, 1993) to suggest that this is due to the emission of SO₂ from the soil. It is known that SO₂ can be generated through reactions involving dissolved sulfite (Barnett and Davis, 1983) which occurs naturally in soils. However, the possibility of SO₂ emission from these soils has been questioned because they are generally moist and SO₂ is extremely soluble (Taylor et al., 1982). Here we report initial field measurements to test the hypothesis that acid sulfate soils can emit SO₂ directly to the atmosphere.

2. Material and methods

Measurements were carried out at two fallow, sugarcane blocks on the Tweed River, northern NSW (28°18'S, 153°31'E) in eastern Australia (Smith et al., 2003; Wilson, 1995) in late spring in 1999 and 2000. The

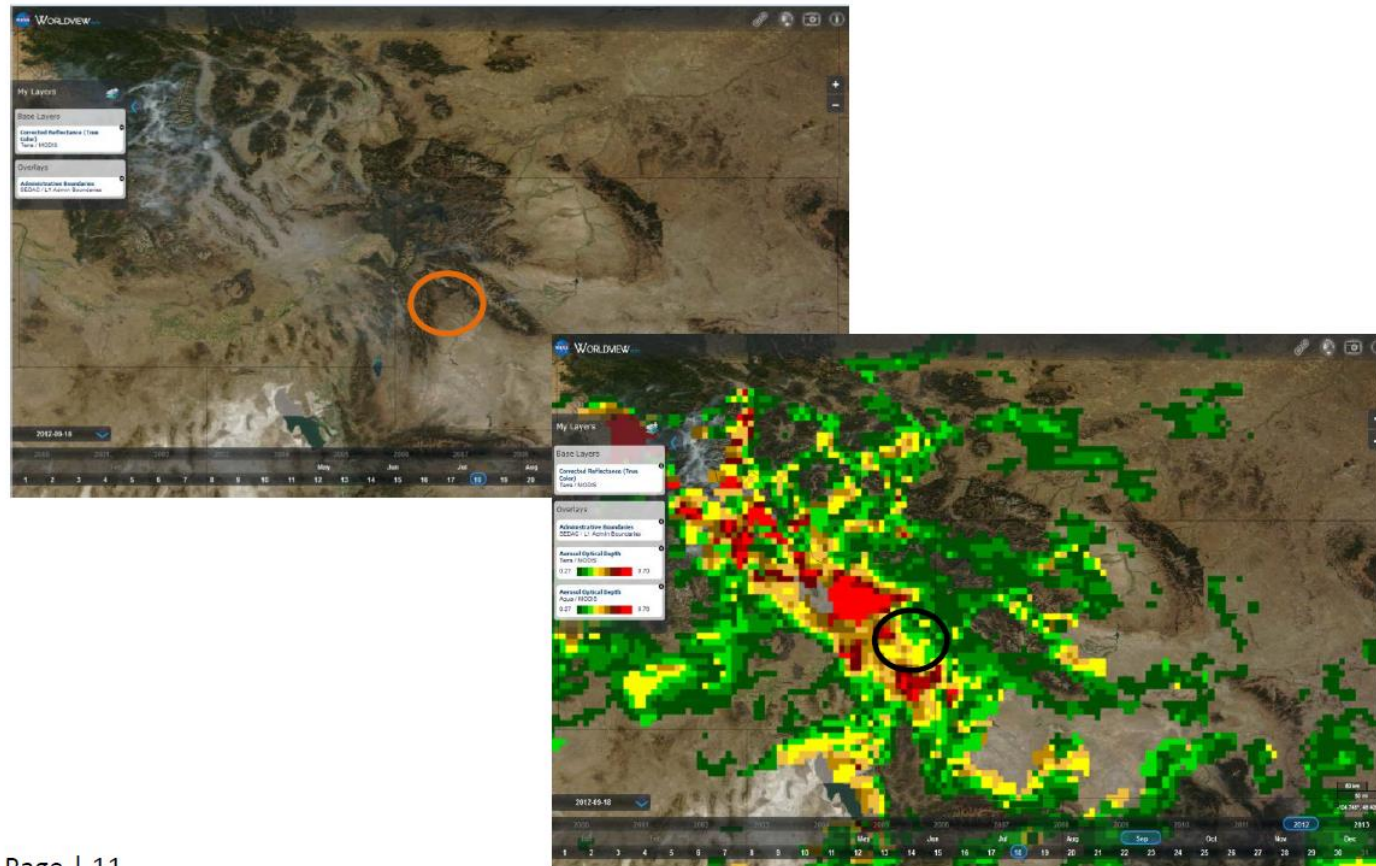
*Corresponding author. Tel.: +61-2-6125-6769; fax: +61-2-6125-0757.

E-mail address: ben.macedonald@anu.edu.au (B.C.T. Macdonald).

National Aeronautics and Space Administration (NASA) MODIS Aerosol Optical Depth Image

MODIS (Moderate Resolution Imaging Spectroradiometer) is a satellite-based optical system that takes “true color” images of the earth’s surface as well as estimating other key air quality parameters in the atmosphere. One useful parameter is Aerosol Optical Depth (AOD), which estimates elevated aerosol levels. MODIS provides valuable real-time images of smoke plumes and other meteorological data: <http://modis.gsfc.nasa.gov/>.

Figure 5: September 18 MODIS true color and AOD images

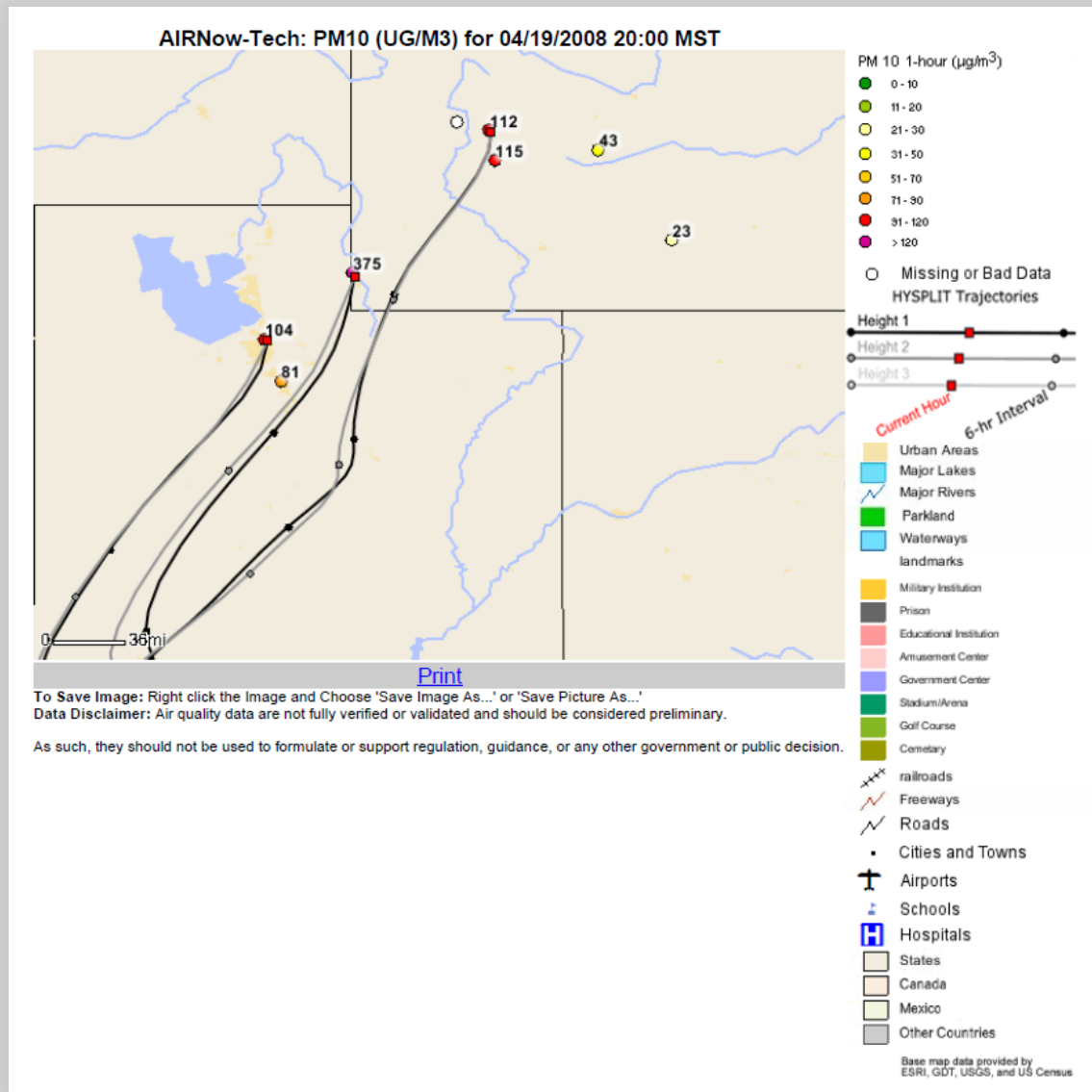


From Air Quality Division Fire EE demonstration for September 18-21, 2012 PM_{2.5} exceedances at multiple sites.

HYSPPLIT Forward/Back-trajectory

The Hybrid Single Particle Lagrangian Integrated Trajectory (HYSPPLIT) Model is used to compute air parcel trajectories, dispersion, and deposition of air pollutants. The model can run either forward- or back-trajectories to estimate the downwind impact of known air parcels, or to estimate the contribution of upwind sources to known pollution levels, respectively. The example below is a back-trajectory. A version of HYSPPLIT can be run through NOAA's Air Resources Laboratory:

<http://ready.arl.noaa.gov/HYSPLIT.php>.



From Air Quality Division high wind EE demonstration for 4/19/2008 PM10 exceedance at Murphy Ridge.

Facility Documentation

Documentation from a facility can provide valuable first-hand evidence that a facility followed established protocols to respond to, and to stay in compliance, during an event. Because the EPA requires a statement of compliance to accompany all approved EE demonstrations, it is extremely important to establish facility compliance in submittals. Qualitative observations and logs by facility personnel can support and give narrative context to quantitative data presented elsewhere in a determination. It is important to note that many of the following elements are a result of prior training and education of facility staff, unique systems set up to address events in real time, and other long-term planning and management efforts undertaken by facilities.

Unplanned Fire Post Burn Report

In compliance with the DEQ-AQD's Smoke Management Requirements, land management agencies must submit Unplanned Fire Post Burn Reports following a fire event that burns greater than 50 acres of managed land.

Appendix G

STATE OF WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY – AIR QUALITY DIVISION

Unplanned Fire Post Burn Reporting Form *For events that exceed 50 acres.*

CONTACT INFORMATION:

NAME Clint Dawson PHONE 307-578-5206
ADDRESS 203A Yellowstone Ave FAX _____
CITY Cody E-MAIL cwdawson@fe.fed.us
STATE WY ZIP 82414
AGENCY/COMPANY (IF APPLICABLE) USDA Forest Service – Shoshone NF
VOLUNTEER FIRE ORGANIZATION: ☒ Fire District No. 2 responsible for structure protection of private structures but entire fire was on federal lands.

BURN NAME Gunbarrel Fire ID # To Be Assigned by WDEQ
LOCATION: COUNTY Park ELEVATION (FEET) 5,500-10,500'
LEGAL: SECTION 11 – ignition TOWNSHIP T52N RANGE R108W
LATITUDE _____ LONGITUDE _____ DATUM _____
UTM: ZONE _____ EAST _____ NORTH _____ DATUM _____
LAND OWNERSHIP: FEDERAL ☒ STATE ☐ MUNICIPAL ☐ PRIVATE ☐
SENSITIVE RECEPTORS: POPULATION(S) ☒ NONATTACHMENT CLASS I AREA(S) ☒
w/i 10 MI. AREA(S) w/i 10 MI. w/i 30 MI.

PUBLIC INFORMATION:

JURISDICTIONAL FIRE NAME Park County Fire District No. 2 DATE/TIME 7/26/08 1500
AUTHORITY(IES): NAME _____ DATE/TIME _____
PUBLIC METHOD Local Newspapers/ Local Radio DATE 7/27/08+
NOTIFICATION: METHOD _____ DATE _____

MANAGEMENT RESPONSE: SUPPRESSION ☐ MANAGE TO ACHIEVE MGT. OBJECTIVE* ☒
* SPECIFY: RESTORATION ☐ MAINTENANCE ☐

DAILY BURN INFORMATION:

DATE (MONTH/DAY/YR)	VEGETATION TYPE (SEE LIST)	ACRES	LOADING (TONS/ACRE)
7/26/08	Forest: heavy dead & down with brush	100	10-75
7/27/08	Forest: heavy dead & down with brush	136	10-75
7/28/08	Forest: heavy dead & down with brush	338	10-75
7/29/08	Forest: heavy dead & down with brush	2065	10-75
7/30/08	Forest: heavy dead & down with brush	1556	10-75
7/31/08	Forest: heavy dead & down with brush	3636	10-75
8/1/08	Forest: heavy dead & down with brush	1733	10-75
8/2/08	Forest: heavy dead & down with brush	5970	10-75
8/3/08	Forest: heavy dead & down with brush	6396	10-75
8/4/08	Forest: heavy dead & down with brush	9120	10-75
8/5/08	Forest: heavy dead & down with brush	1623	10-75
8/6/08	Forest: heavy dead & down with brush	2192	10-75
8/7/08	Forest: heavy dead & down with brush	640	10-75

Unplanned Fire Post Burn Reporting

November 2004 1 of 2

From Air Quality Division Fire EE demonstration for 8/1/2008 PM_{2.5} exceedance at Cody.

Dust Control Measures Form

Many facilities are required by permit to develop an Air Monitoring Action Plan in the event of high winds. These plans outline a number of reactionary and reporting requirements, including forms similar to the one below.

Reactionary Dust Control Measures Form

Date/Time: 6/29/07
Conditions: Visible dust
Wind speed: 25+
Wind direction: West

Describe the weather/soil conditions: (i.e., Recent precipitation events, dry, wet, gusty winds)

Dry conditions

Observed Dust Conditions: (Is there noticeable dust blowing, where is the excessive dust being created)

Dust blowing from inactive areas

Reactionary Measures taken: (Explain any measures taken to control or reduce the amount of dust generated)

Short Haul and slow to 4th Gear - utilise all available water trucks

1). Directed water trucks to areas generating excessive dust. (Describe action)

070-071 to longer runs - 062 to flats on Coal road

2). Increased number of water trucks operating. (Document change in number of trucks operating)

running all

3). Overburden operations directed to shortest haul available. (Describe action)

from start of shift Hauled short

4). Overburden haulage directed to a lower bench. (Describe action)

shl operating on hard road not creating much dust. Sh 3 on lower bench hauling low

5). Coal fires extinguished. (Describe action)

None Noted

6). Scoria operations shut down. (Describe action)

N/A

7). Required contractor to increase watering or shut contractor operations down. (Describe action)

N/A

9). Road maintenance evaluated and extraneous activities (i.e. rock haulage curtailed).

only blocking rough areas and short sections

10). Other actions taken. (Describe action)

Signed: _____

Gary R. Williams

Air Monitoring Action Plan Compliance Chart

Below is another example of a reporting component of an Air Monitoring Action Plan.

Black Butte Coal Company Air Monitoring Action Plan Compliance Chart January 18, 2011

Each benchmark below was reached during at least one point in the day on October 18, 2011. Each action plan recommendation is in bold, and the response to each recommendation is followed below in italics.

Action level short term (1 hour):

300 µg/m³ level

Ensure adequate water trucks are operating in the area.

Two 777 water trucks were onsite on January 18, 2012, and their equipment numbers are 19-0981 and 19-1007. Truck 19-0981 was at Pit 14 that morning with the truck fleet that was running inner burden, and truck 19-1007 was in the shop getting it's left front wheel seal repaired until 1:00 PM. At 1:00 PM the leadman requested for the operator of truck 19-0981 at Pit 14 to move to Pit 10 to water down that area, because it would be quicker to mobilize 19-0981 than the repaired truck 19-1007.

Ensure problem areas are addressed.

The water truck addressed drivable stripped areas of the Pit 10 area.

Record when and where watering activities are being done.

Actions were documented by leadmen on the day and night shifts..

Record total water usage in gallons, for this shift.

Four loads equaling 72,000 gallons were recorded during the day shift for the Pit 10 area. Also, recorded 126,000 gallons applied to Pit 10 and Pit 11 during the night shift.

Action level (24 hour average):

70 µg/m³ level

Ensure adequate water trucks are operating in the area.

Two 777 water trucks were onsite on January 18, 2012, and their equipment numbers are 19-0981 and 19-1007. Truck 19-0981 was at Pit 14 that morning with the truck fleet that was running inner

Page 1 of 3

Table 2

From Black Butte Coal Company High Wind EE demonstration for 1/18/2012 PM₁₀ exceedance at Black Butte Mine.

Action Plan Event Log

Below is another example of a reporting component of an Air Monitoring Action Plan.

Action Plan Event Log
Action Report
Day Shift

THIS REPORT WILL BE COMPLETED IN ITS ENTIRETY BY THE ON SHIFT SUPERINTENDENT PRIOR TO LEAVING AT THE END OF THE SHIFT.

I. Concentrations which trigger the action plan.

In the table below record the date, time, and concentration at which action plan levels were reached

	500 ug/m ³ (1-hour)			70 ug/m ³ (24-hour)			80 ug/m ³ (24-hour)			110 ug/m ³ (24-hour)			150 ug/m ³ (24-hour)		
	Date	Time	1-hour reading	Date	Time	24-hour reading	Date	Time	24-hour reading	Date	Time	24-hour reading	Date	Time	24-hour reading
Pit 10	3-17	1:00	533	3-17	PM	71.72									
I-80															
Pit 14															
Leucite															
UPWIND															

II. Identify problem areas, ensure problem areas are addressed, ensure adequate water trucks are operating in the areas, and record when and where watering activities were being done. Please give priority to the areas listed in the table below.

Place an X by each area that is visibly contributing to airborne dust, and describe the severity of dust emission in Section VI of this report. Also, fill out the supplemental information for each applicable area. Take photograph's if possible	Was the water truck requested to address this specific area?	At what time was the initial request made?	How many loads of water were applied in this area.	At what times was the water truck in this area.
South half of Pit 10 highwall	Yes / No	am/pm	loads	
<input checked="" type="checkbox"/> Pit 10 assist bench	<input checked="" type="checkbox"/> Yes / No	7 am/pm	loads	7am to 6pm
<input checked="" type="checkbox"/> Road in spoils on North side of Pit 10	<input checked="" type="checkbox"/> Yes / No	7 am/pm	loads	7am to 6pm
Pit 11 highwall	Yes / No	am/pm	loads	
Pit 11 spoils	Yes / No	am/pm	loads	
Dragline #1's pad and access road	Yes / No	am/pm	loads	
Pit 10 inactive spoils	Yes / No	am/pm	loads	
Pit 10 pre-strip	Yes / No	am/pm	loads	
Pit 10 topsoil stockpiles	Yes / No	am/pm	loads	
Pit 10 out of pit stockpiles (OOPS)	Yes / No	am/pm	loads	
Pit 11 OOPS	Yes / No	am/pm	loads	
<input checked="" type="checkbox"/> Pit 11 topsoil pile	<input checked="" type="checkbox"/> Yes / No	am/pm	loads	6-1 (Continued)
Pit 10 hopper/stockpile	Yes / No	am/pm	loads	
Pit 8 stilling shed/ stockpile	Yes / No	am/pm	loads	
<input checked="" type="checkbox"/> Pit 14 haul roads	<input checked="" type="checkbox"/> Yes / No	2 am/pm	loads	7-6pm
Pit 14 OOPS or topsoil stockpiles	Yes / No	am/pm	loads	
<input checked="" type="checkbox"/> Drag #2's pad and access road	<input checked="" type="checkbox"/> Yes / No	0 am/pm	loads	6-6pm
	Yes / No	am/pm	loads	
	Yes / No	am/pm	loads	
	Yes / No	am/pm	loads	
	Yes / No	am/pm	loads	
	Yes / No	am/pm	loads	

Were the water trucks below available on the day of the event?	If the truck was available, please specify the time during the shift that the water truck was put into service.	If unavailable, please specify the reason. Include any WO's associated with maintenance and repairs.
19-0981	<input checked="" type="checkbox"/> Yes / No	
19-1007	<input checked="" type="checkbox"/> Yes / No	Was down for 2 hrs with no problem
	Yes / No	
	Yes / No	

engineering\Environmental R-Drive\ENV_01_Air_Emissions\Air Quality Concerns - Responses\2013\Forms\Action Plan Event Log and Shutdown Information.xlsx\Shutdown R.

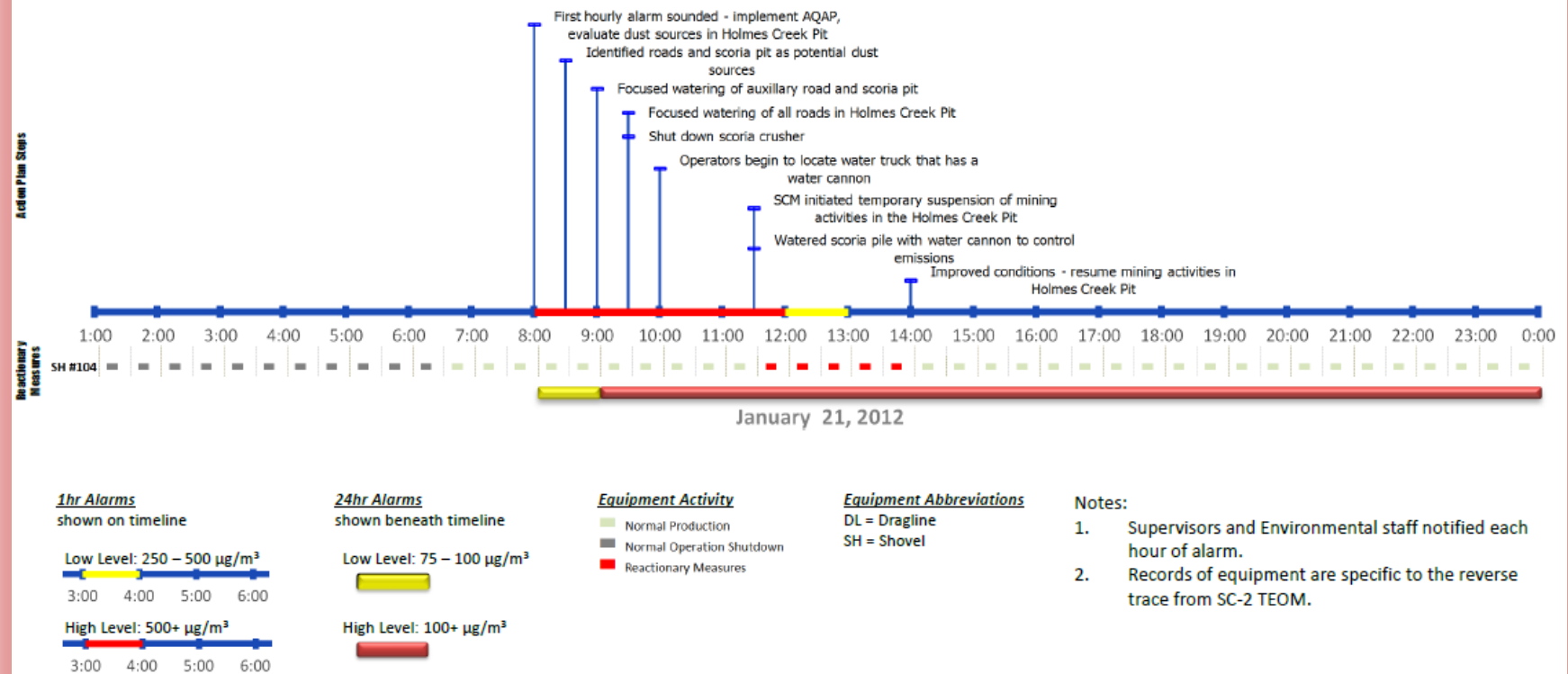
Page 1 of 5

From Black Butte Coal Company High Wind EE demonstration for 3/17/2014 PM10 exceedance at Black Butte Mine.

Timeline

A timeline can help to visually summarize a large amount of data and temporally organize an event in a logical manner. Different parameters, such as reactionary measures taken, wind speed, and pollutant concentrations may be plotted together in order to demonstrate correlation.

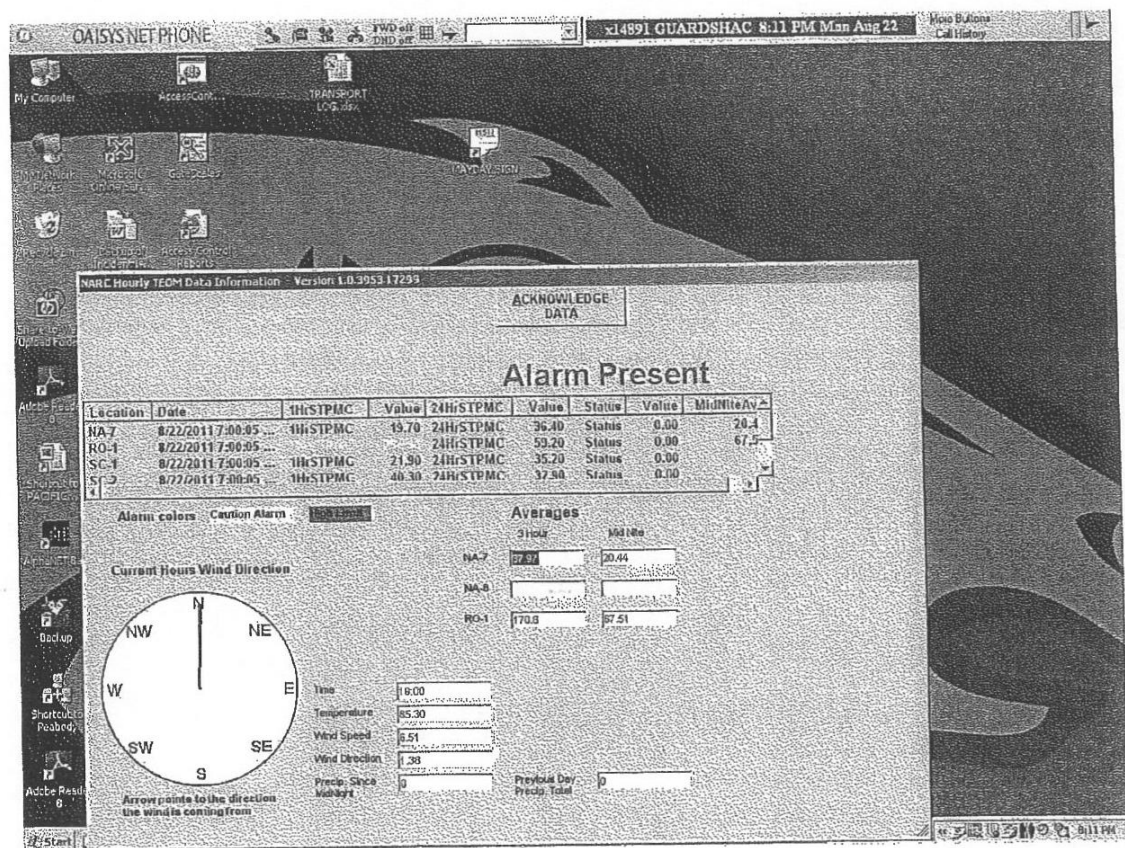
Figure 4: Timeline for SC-2 High Wind Event



From Peabody School Creek Mining, LLC High Wind EE demonstration for 1/21/2012 PM₁₀ exceedance at School Creek Mine.

Air Quality Alarm

As part of its Air Monitoring Action Plan, the North Antelope Rochelle Mine has set up an automated alarm system in its security office that is activated if monitored emissions elevate to a level of concern. When an alarm is present, a number of response actions are taken by mine personnel.



RO-1 1-HR 294.90

From Peabody Energy Fire EE demonstration for 8/23/2011 PM₁₀ exceedance at North Antelope Rochelle Mine.

Supervisor Checklist for Air Quality Alarms

Below is an example of the air quality alarm response actions specified in North Antelope Rochelle Mine's Air Monitoring Action Plan.

SUPERVISOR CHECK LIST FOR AIR QUALITY ALARMS		
Coal	<input checked="" type="checkbox"/>	Overburden _____ Dragline _____
<input type="checkbox"/> Record the time and date of call, √ site(s) where the alarm occurred.		
Comments: <u>see attached print outs</u>		
Time of Call(s): ____ : ____ : ____ : ____ : ____ : ____		
Site: NA-5 _____ NA-8 <input checked="" type="checkbox"/> RO-1 <input checked="" type="checkbox"/>		
<input type="checkbox"/> Record observed conditions of coal pit; are there dusty conditions or coal fires, and where are they located.		
Comments: <u>Small smokers in Oil Well pits and North middle. Inversion this morning, not much of a breeze. Main roadways wet.</u>		
<input type="checkbox"/> Record actions taken to correct conditions.		
Comments: <u>Shut down Rochelle, watered roads, around chance houses and shops + plant areas. Shut Down Dirt Contractors. Called pit advisory - no unnecessary travel.</u>		
<input type="checkbox"/> Call overburden/coal/dragline supervisor and ask them to check for dusty conditions in their work areas.		
Comments: <u>All available water trucks were running.</u>		
<input type="checkbox"/> Record observed weather conditions; windy, storm approaching, inversion.		
Comments: <u>Inversion + Calm</u>		
<input type="checkbox"/> Record observed off-site impacts that may be contributing to the alarm conditions; grass or other fires, blasting cloud, excessive gravel road traffic, rail loop activities.		
Comments: <u>Air smelled smokey + hazy around entire area. possible old site grass fires.</u>		
<input type="checkbox"/> Sign & Date Check List and send to Bryan Hansen or Jeffrey Goldsmith.		
Name (Print)	<u>Starr Hughes</u>	Signature <u>[Signature]</u> Date <u>8-24-11</u>

From Peabody Energy Fire EE demonstration for 8/23/2011 PM₁₀ exceedance at North Antelope Rochelle Mine.

Correspondence Log

Copies of correspondence records between facility personnel, compliance agencies, or other entities can be presented to demonstrate due diligence in dealing with response actions, to present information gained from outside sources, and to exhibit transparency.

Landon.Smith

From: Kirk Billings <kirk.billings@wyo.gov>
Sent: Friday, April 20, 2012 1:36 PM
To: Cody.Weatherly
Cc: Darla Potter; Tanner Shatto; Laura.Ackermann
Subject: Re: 24 Hour Particulate Matter Concentration Exceedance on April 12, 2012
Attachments: Exceptional Event or NEAP Informal Guidance 20120123.docx

Follow Up Flag: Follow up
Flag Status: Completed

Cody,
Thanks for taking the time to talk to me on the phone today about your 4/12/12 exceedance. I have attached an information sheet I put together for facilities writing packets for Exceptional Events. It is meant to get you started, but is not exhaustive. As I mentioned on the phone, feel free to contact me if I can be of assistance. Finally, in the future would you please cc me on all correspondence regarding monitoring at your facility? Thanks.

--

Kirk Billings
Wyoming Department of Environmental Quality
Air Quality Division, Monitoring Group
(307) 335-6963 (desk)
(307) 438-2470 (cell)
kirk.billings@wyo.gov

On Fri, Apr 20, 2012 at 12:53 PM, Tanner Shatto <tanner.shatto@wyo.gov> wrote:
FYI

----- Forwarded message -----

From: <Cody.Weatherly@kiewit.com>
Date: Fri, Apr 20, 2012 at 11:24 AM
Subject: RE: 24 Hour Particulate Matter Concentration Exceedance on April 12, 2012
To: Tanner.Shatto@wyo.gov
Cc: Laura.Ackermann@kiewit.com

Mr. Shatto,

On April 12, 2012 Buckskin exceeded the 24 hour particulate matter (PM) concentration on the North TEOM. We are currently collecting data to create a report to send.

Inspection Report

Yearly inspections are conducted at facilities to ensure compliance with permit conditions. Including applicable sections of reports from inspection reports can further support claims of compliance during an event.

Section 36 Monitor - March 4, 2013 High Wind Event Excerpts from DEQ's 2012 Inspection Report

Permit MD-10986 March 16, 2011

Air Quality Permit MD-10986 was issued March 16, 2011 to combine the Black Thunder Mine and Jacobs Ranch Mine into one entity (Black Thunder Mine) with a maximum annual coal production rate of 190 million tons per year, and modify the coal progression sequence. This permit supersedes all previous Chapter 6, Section 2 permits and waivers for the Black Thunder and Jacobs Ranch Mine, except for Permit MD-10900.

1. That authorized representatives of the Division of Air Quality be given permission to enter and inspect any property, premise or place on or at which an air pollution source is located or is being constructed or installed for the purpose of investigating actual or potential sources of air pollution and for determining compliance or non-compliance with any rules, standards, permits or orders.
2. That all substantive commitments and descriptions set forth in the application for this permit, unless superseded by a specific condition of this permit, are incorporated herein by this reference and are enforceable as conditions of this permit.
3. That a permit to operate, in accordance with Chapter 6, Section 2(a)(iii) of the WAQSR, is required after a 120-day startup period in order to operate this facility.

IN COMPLIANCE	<input checked="" type="checkbox"/> YES	NO
COMMENTS: Request for a permit to operate received 5/11/2011.		

4. That all notifications, reports and correspondences associated with this permit shall be submitted to the Stationary Source Compliance Program Manager, Air Quality Division, 122 West 25th Street, Cheyenne, WY 82002 and a copy shall be submitted to the District Engineer, Air Quality Division, 2100 West 5th Street, Sheridan, WY 82801.

IN COMPLIANCE	<input checked="" type="checkbox"/> YES	NO
COMMENTS:		

5. That written notification of the anticipated date of initial startup of the change in coal removal progression, in accordance with Chapter 6, Section 2(i) of the WAQSR, is required not more than sixty (60) days or less than thirty (30) days prior to such date. Notification of the actual date of startup is required within fifteen (15) days after startup.

IN COMPLIANCE	<input checked="" type="checkbox"/> YES	NO
COMMENTS:		

6. That the following requirements shall be met for all atomizer/fogger systems at the Black Thunder Mine:
 - a. The atomizer/fogger systems shall be operated and maintained so the system enclosure exhibits no visible emissions as determined by Method 22 of appendix A, 40 CFR part 60.
 - b. That the atomizer/fogger systems and associated monitoring equipment shall be operated during all times that the respective coal preparation facilities are in operation.
 - c. Thunder Basin Coal Company shall conduct, at minimum, daily visual observations of the atomizer/fogger systems to determine the presence of visible emissions on any day the respective coal preparation facilities are in operation. Records shall be kept documenting whether visual emissions are noted and the corrective action taken. These records shall be maintained for a period of five (5) years and shall be made available to the Division upon request.
 - d. Thunder Basin Coal Company may utilize 40 CFR §60.255(f) of Subpart Y in lieu of utilizing (b) of this condition to demonstrate continuous compliance with (a) of this condition.

From Thunder Basin Coal Company, LLC High Wind EE demonstration for 3/4/2013 PM₁₀ exceedance at Black Thunder Mine.

Shift Report

Routine or daily shift reports provide a sense of facility operations on or around an event. Depending on the record-keeping protocols of a facility, these can reflect general operations or detail specific aspects of facility procedures, such as the water wagon operator shift report below.

BRIDGER COAL COMPANY
PRE OPERATION INSPECTION CHECKLIST FOR WATER WAGON OPERATOR SHIFT REPORT

OPERATOR: [REDACTED] UNIT NO.: 744
 DATE: 6-5-12 SHIFT: DAY AFT NIGHT

LOADING INFORMATION		LOAD COUNT	WATER SYSTEMS CHECKLIST	OPERATIONAL		ACTION TAKEN
UNIT	LOCATION			YES	NO	
56		111	1. FILLER HOLE SCREEN (in place and clear)	<input checked="" type="checkbox"/>		
60		111	2. DRAIN VALVES WORKING	<input checked="" type="checkbox"/>		
32		111	3. TIRE TRUCK CONNECTING CLEAN, FLOSHED, & COVERED	<input checked="" type="checkbox"/>		
			4. OPERATOR'S CONTROLS WORKING	<input checked="" type="checkbox"/>		
			5. PUMP DRIVE MOTOR FOR LEAKS	<input checked="" type="checkbox"/>		
			6. TANK SPRAYERS FOR LEAKS	<input checked="" type="checkbox"/>		
			7. SPRAYERS AND WATER CANNONS WORKING	<input checked="" type="checkbox"/>		

(18)

UTILIZATION SUMMARY

DAY	AFT	TOTAL
5:00	4:00	12:00
6:00	5:00	1:00
7:00	6:00	2:00
8:00	7:00	3:00
9:00	8:00	4:00
10:00	9:00	5:00
11:00	10:00	6:00
12:00	11:00	7:00
1:00	12:00	8:00
2:00	1:00	9:00
3:00	2:00	10:00
4:00	3:00	11:00
5:00	4:00	12:00

EQ. UTILIZ. DIST.	COST CENTER	HRS
WORK HRS.	01	
WORK HRS.	01	
WORK HRS.	01	
DELAY HRS.	03	N/A
MAINT. HRS.	04	N/A
STANDBY HRS.	02	N/A
TOTAL HRS.	07	

*NOTE: TOTAL HRS. SHOULD CORRELATE SCHEDULED SHIFT TIME (EXCEPT ON 12 HRS.)

EXPLANATION OF ABNORMAL DELAYS

 SUPERVISOR SIGNATURE

From Bridger Coal Company High Wind EE demonstration for 6/5/2012 PM10 exceedance at Bridger Coal Mine.

Environmental Checklist

Below is another example of a shift report.

NAUGHTON OPERATIONS ENVIRONMENTAL CHECKLIST			
Must be completed daily and all questions must be answered.			
Operator: <u>Hatch</u>		Shifter Signature: <u>[Signature]</u>	Date: <u>Jan 11/12</u>
ITEM	STATUS	COMMENTS	W/O # - Corr. Action
Sewer Treatment Facility Aerators operating - See OPR-26 Sewage Aeration Sys Checks	Circle status <u>Yes</u> / No		
Ash Ponds Oil on ponds? Yes / <u>No</u> Oil booms present? <u>Yes</u> / No Oil booms in good condition? <u>Yes</u> / No Are there any floating solids or foam in other than trace amounts in the discharge? (Inspect for unusual signs that might indicate chemicals or high concentrations may have been discharged from the pond, notify Environmental Department.) Yes / <u>No</u> Indications of leakage/breaching/failure? (Inspect top, face and toe of dikes for signs of cracks, soil movement, erosion, rodent burrows and woody vegetation. Document location and notify Shift Supervisor and Environmental Department.) Yes / <u>No</u> Seepage around weirs? (Check Outfalls 001 and 002 for any seepage around or under the weirs. Contact Environmental Department if any seepage identified.) Yes / <u>No</u> North Ash pond aerators/floodlight functioning? (Winter only - If Summer, indicate in comments section.) <u>Yes</u> / No / N/A			
FGD Ponds Bird Avert system normal? (System should activate when driving around pond. radar bar should be turning.) <u>Yes</u> / No Birds on pond? (Notify Environmental Department of any rescued/dead/ rehabilitated birds (prior to release) - Provide detailed documentation in logbook.) Yes / <u>No</u> Indications of leakage/breaching/failure? (Inspect top, face and toe of dikes for signs of cracks, soil movement, erosion, rodent burrows and woody vegetation. Document location and notify Shift Supervisor and Environmental Department.) Yes / <u>No</u> Liner in good shape? (Check for rips and tears. Notify Env. Department immediately if any identified.) <u>Yes</u> / No			
Oil Vessels Leaks or spills on or around tanks / transformers?	Yes / <u>No</u>		

From PacifiCorp High Wind EE demonstration for 1/12/2012 PM₁₀ exceedance at Naughton Power Plant.

Daily Production Report

Below is another example of a shift report, focused on production.

Date	3/26/2012	Pre-Heater	STARTED CLEANING THE TOWER 3 AND 4 DONE STARTED ON 5.	Blend Silo 1	62
Coordinator	[REDACTED]			Blend Silo 2	82
Supervisor	[REDACTED]			Total Feed:	144
Operator	[REDACTED]			A Mill Type	II/V
Shift	1 (6am-6pm)	K2 Kiln and Kiln Cooler	DOWN FOR BRICK	A Mill Silo #	1
Crusher and Raw Materials				B Mill Type	II/V
		K2 Kiln TPH	0.00	K2 DUST TPH	
Roller Mill	DOWN FOR K2 OUTAGE	K2 Kiln RPM	0.00	B Mill Silo #	10
		K2 Kiln Ratio	0.00		
		K2 Run Hrs.	0.00	Export info.	
RM Run Hrs.	0.00	Clinker Storage and Handling	SHUTTLE BELT CHUTE PLUGGED A COUPLE OF TIMES	Kiln Outage List	Print Outage Report
Blend Silos	62 82	A Mill	12.00	Visible Emissions Observation	
			INTO CS #1 @ 4:45P. FILL TO 25' OR SO.	Item	Visible Emissions Y/N ?
Kiln and Kiln Cooler	3 PINS IN 770 GOOD DUST TANK IS 14.2' AND 11'	B Mill	12.00	Crusher Lg DC	N
			CHUNKS IN THE 607 A FEW TIMES INTO CS#10 @ 4:45P.	Crusher Sm DC	N
		B Mill	12.00	R-111 Belt Dschg	N
				Blend Silo 1 K207-1	N
		Finish Silos	A MILL IN CS #1 B MILL IN CS #10	Blend Silo 2 K207-2	N
K1 Kiln TPH	[REDACTED] K1 DUST TPH [REDACTED]			Kiln 2 Feed Scale	N
K1 Kiln RPM	[REDACTED]			Preheater Building	N
K1 Kiln Ratio	[REDACTED]			Kiln Dust Storage/loado	N
K1 Run Hrs.	12.00	Misc. Problems and Automation Control System Issues CALL OUTS	1 DUST TRUCK MID SHIFT	K-553 Coal Tunnel	N
K1 and K2 Coal Mills	K1 COAL MILL GOOD			K-1 783 Clk Conveyor	N
				F-405 Clk Stg Load-In	N
Environmental and Permitting:	GOOD NO PROBLEMS			F-410 Clk Stg Load-Out	N
				F-406 Clk Reclaim Twr	N
				B-882 Rail Unloading	N
				Burner Building	N
				A Mill Dust Collector	N
				B Mill F-540 Dust Collect	N
				B Mill F-544 Dust Collect	N
				B Mill F-550 Dust Collect	N
				C Mill F-776 Dust Collect	N
				All visible emissions must be explained	

From Mountain Cement Company High Wind EE demonstration for 3/26/2012 PM10 exceedance at Mountain Cement.

Audit Reports

The inclusion of Audit Reports for air monitoring equipment demonstrates the state of a facility's monitoring network at the time of an event.

iml Air Science
a division of Inter-Mountain Laboratories, Inc.

555 Absaraka, Sheridan, WY 82801

Partisol Audit

Network: Laramie River Station

Date: 2/19/2007

Sampler ID: 20299(PM10B) Satellite ID: N/A

Audited By: S.Engel & S.Hansen

Time: 1018 MST

FTS ID: 960901

m = 0.3995

b = -0.6706

Initial Calibration Values

Initial Calibration Values

Sensor	Offset	Span
Amb. Temp.		0.9963
Pressure		0.9774
Flow	-0.0079	0.9603

FTS Relationship: $Q_a = m \left(\sqrt{\frac{\Delta P \cdot T_a}{P_a}} \right) + b$

Qa: L/min

ΔP : inches H₂O

T_a: Kelvin

P_a: atmospheres

Leak Check: Pass
(Half the reading in 30 seconds)

V-seals replaced: No

Other seals replaced: No

In-line filter replaced: No

Inlet Serviced/Cleaned: Yes

Accuracy Audit

Sensor	Indicated	ΔP	Actual	Difference	Specification
Temperature	0.1		1.1	1.0	± 2.0 °C
Pressure	0.840		0.842	0.002	± 0.020 atm
Flow	16.60	6.24	17.30	0.70	16.7 L/min \pm 7.0% (± 1.17 L/min)

Calibration

Sensor	Offset	Span	FTS ID:
Temperature		1.0001	980304
Pressure		0.9801	m = 0.4201
Flow	-0.0079	1.0271	b = -0.5528

Post Calibration Flow Check

Sensor	Indicated	ΔP	Actual	Difference	Specification
Flow	16.70	5.72	16.60	0.10	16.7 L/min \pm 7.0% (± 1.17 L/min)

Comments:

From Basin Electric Power Cooperative High Wind EE demonstration for 1/6/2007 PM₁₀ exceedance at Laramie River Station.

Quarterly Reports

Like audit reports, quarterly reports lend context to the state of a facility's monitoring network at the time of an event.

Mountain Cement Company
1st Quarter 2012 Continuous Emission Monitoring Report

Summary of Compliance Requirements

The operators did not deviate from the Startup, Shutdown, and Malfunction Plan (SSMP) during the quarter.

Operations and maintenance activities performed during the quarter complied with the Operation and Maintenance (O&M) Plan.

It is standard operating procedure at Mountain Cement Company to inspect portions of the combustion system when the pyroprocess is shut down for extended periods (e.g., 12 hours) and personnel open and enter the process system. Both combustion systems were inspected/repaired during the Spring 2012 outage which had taken place March 25, 2012 and extended through April 9, 2012.

Monitoring required under the MACT and CAM regulations is being performed according to the requirements. Monitoring reports are kept in the Environmental Manager's office. The results of this monitoring are summarized in the semi-annual report.

Field filter audits were conducted on the opacity monitors for Kiln No. 1&2 and Cooler No. 1&2 during this quarter on February 13 and March 12, 2012. All monitors passed the standards for accuracy.

Quarterly gas audits were performed on March 12, 2012, by Mountain Cement personnel. Results of the gas audits were satisfactory for all continuous emissions monitors.

Thermocouple audits were conducted for Kiln No. 1 and Kiln No. 2 on March 13, 2012. The thermocouples are located on the inlet of the kiln baghouses. Results of the thermocouple audits revealed that they were operating within tolerable limits of accuracy.

From Mountain Cement Company High Wind EE demonstration for 1/18/2012 PM₁₀ exceedance at Mountain Cement.

Maintenance Records

Preventative or reactive maintenance records can show facility compliance with permit requirements, or summarize the performance of facility equipment.



Order # 26075579
PM Preventive Maintenance
Priority # 3

T

Order Text: WEEKLY FUGITIVE DUST COMPLIANCE PM EOs

Func Loc:	T-1535-0-SS-RAG	Equipment:	GROUNDS/ROADS
Assembly:		Tech ID #:	NOGR
Plan Desc:	WEEKLY FUGITIVE DUST COMPLIANCE PM	PM Plan #:	NOGR001

Created Date:12/26/2011

Basic Start Date:01/12/2012

Oper	Work Center	Operation Description	No.	Total Hrs.	Compl.
0010	EQ-NA-EO	WEEKLY FUGITIVE DUST COMPLIANCE PM EOs	1	6.0	Y / N
Oper	Operation Long Text				
0010	WEEKLY FUGITIVE DUST COMPLIANCE PM EOs The Naughton Plant Fugitive Dust Compliance Plan requires that the dirt roads around the plant be watered twice weekly and the paved roads once weekly (ambient temperature permitting). Please perform this work, document it on this form and in the log book and return this form to the Environmental Engineer upon completion. Thank you. Week of: <u>1-8 to 1-14</u>				
Area	Date Completed	Action Taken	Weather Condition	Operator Name	
Dirt Roads	<u>1-11-12</u>	<u>Watered</u>	<u>Windy</u>	<u>W. Stubbbs</u>	
1st time/week	<u>1-11-12</u>	<u>Watered</u>	<u>Windy</u>	<u>W. Stubbbs</u>	
2nd time/week	<u>1-12-12</u>	<u>Watered</u>	<u>Windy</u>	<u>W. Stubbbs</u>	
Paved Road	<u>1-11-12</u>	<u>Watered</u>	<u>Windy</u>	<u>W. Stubbbs</u>	

Order Long Text:

WEEKLY FUGITIVE DUST COMPLIANCE PM EOs

The Naughton Plant Fugitive Dust Compliance Plan requires that the dirt roads around the plant be watered twice weekly and the paved roads once weekly (ambient temperature permitting).

Please perform this work, document it on this form and in the log book and return this form to the Environmental Engineer upon completion.
Thank you.

Equipment Timecards

Equipment records show where, and for how long, facility equipment was dispatched at the time of an event.

DAILY CREW TIME CARD				COST CODES				COST CODE				WORK ORDERS				PAID TIME OFF				OPERATIONAL DELAYS				DOWN TIME				CREW 3 E					
Date	Foreman	Shift	Supervisor	22 CL OPERATOR	31 CL OPERATOR	55 BLADE OPERATOR	60 HAUL TRUCK	67 DL DOZER	68 HAUL TRUCK	69 HSC BLUNDER/COAL DOZ	70 HSC BLUNDER/COAL DOZ	71 HSC BLUNDER/COAL DOZ	72 HSC BLUNDER/COAL DOZ	73 HSC BLUNDER/COAL DOZ	74 HSC BLUNDER/COAL DOZ	75 HSC BLUNDER/COAL DOZ	76 HSC BLUNDER/COAL DOZ	77 HSC BLUNDER/COAL DOZ	78 HSC BLUNDER/COAL DOZ	79 HSC BLUNDER/COAL DOZ	80 HSC BLUNDER/COAL DOZ	81 HSC BLUNDER/COAL DOZ	82 HSC BLUNDER/COAL DOZ	83 HSC BLUNDER/COAL DOZ	84 HSC BLUNDER/COAL DOZ	85 HSC BLUNDER/COAL DOZ	86 HSC BLUNDER/COAL DOZ	87 HSC BLUNDER/COAL DOZ	88 HSC BLUNDER/COAL DOZ	89 HSC BLUNDER/COAL DOZ	90 HSC BLUNDER/COAL DOZ	EMPLOYEE SIGNATURE	HURRY TODAY
ID #	Employee Name	Cost Code	Total Hours	PT 8	PT 10	PT 11	PT 14	PT 21	SEAM	LC	7010.02	7010.03	7010.04	7010.05	7010.06	7010.07	7010.08	7010.09	7010.10	7010.11	7010.12	7010.13	7010.14	7010.15	7010.16	7010.17	7010.18	7010.19	7010.20	7010.21	7010.22	7010.23	7010.24
176876	Matt Campbell	7																															
Equipment #	05-2027																																
Equipment #																																	
Equipment #																																	
122601	Cameron Elder	31	12																														
Equipment #	05-2027																																
Equipment #																																	
Equipment #																																	
168791	Sam Hannah	31	15																														
Equipment #																																	
Equipment #																																	
Equipment #																																	
167304	Kyle Krosche	68	15																														
Equipment #	05-2001		11.5																														
Equipment #																																	
Equipment #																																	
203777	Terry Pearson	51	11.5																														
Equipment #	10-1007		11.5																														
Equipment #																																	
Equipment #																																	
4024	Bob Puckett	2	12																														
Equipment #	10-7122		11.3																														
Equipment #																																	
Equipment #																																	
1920	John Brown	2	5																														
Equipment #																																	
Equipment #																																	
Equipment #																																	

From Black Butte Coal Company High Wind EE demonstration for 1/13/2014 PM10 exceedance at Black Butte Mine.

Legal Documents

The inclusion of specific legal documents can help clarify ownership, compliance, or other legal issues. The following license agreement demonstrates that the land on which Black Butte Coal Company's Leucite TEOM is located is owned by another party.

LICENSEE'S DUP. ORIG.

LICENSE AGREEMENT

THIS AGREEMENT, made and entered into this 13th day of April, 1994, by and between UNION PACIFIC LAND RESOURCES CORPORATION, a corporation of the State of Nebraska (hereinafter called "Licensor") whose address is P.O. Box 7, Fort Worth, Texas 76101-0007, and BLACK BUTTE COAL COMPANY, a Joint Venture (hereinafter called "Licensee"), whose address is P.O. Box 98, Point of Rocks, Wyoming 82942.

RECITALS:

Licensee desires to construct, maintain and operate air quality monitoring stations and to use existing non-exclusive roadways (hereafter called "Facility") upon Licensor's premises situate in Sections 11 and 13, Township 20 North, Range 101 West of the Sixth Principal Meridian, Sweetwater County, Wyoming, (hereafter called "Licensed Premises") in the locations shown on the print hereto attached marked Exhibit "A" and made a part hereof.

AGREEMENT:

NOW, THEREFORE, it is mutually agreed by and between the parties hereto as follows:

Section 1: LICENSOR GRANTS RIGHT

In consideration of the sum of Ten and No/100 Dollars (\$10.00) to be paid by Licensee to Licensor upon execution and delivery of this agreement, and in further consideration of the covenants and agreements herein contained to be by Licensee kept, observed and performed, Licensor hereby grants to Licensee, subject to the terms and conditions herein stated, the right to maintain and operate, during the term hereof, said Facility upon said Licensed Premises in the locations described in said Exhibit "A".

The foregoing grant is subject to the right and power of Licensor, its successors and assigns, to the use of the Licensed Premises for any purpose not inconsistent with the use by Licensee for the purposes herein defined.

The foregoing grant is also subject to all outstanding superior rights (including those in favor of telegraph and telephone companies, lessees of said right of way, and others) whether recorded or unrecorded and the right of Licensor to renew and extend the same.

Section 2. MAINTENANCE AND USE

Licensee shall maintain said Facility in the locations described on Exhibit "A". All work performed by Licensee on said